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Economies

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Suggested Citation: Menegaki, Angeliki (2018) : The basic, the solid, the site-specific and the full or total Index of Sustainable Economic Welfare (ISEW) for Turkey, *Economies*, ISSN 2227-7099, MDPI, Basel, Vol. 6, Iss. 2, pp. 1-18,
<https://doi.org/10.3390/economies6020024>

This Version is available at:

<https://hdl.handle.net/10419/197076>

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Article

The Basic, the Solid, the Site-Specific and the Full or Total Index of Sustainable Economic Welfare (ISEW) for Turkey

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Received: 3 October 2017; Accepted: 19 March 2018; Published: 3 April 2018



Abstract: The Index of Sustainable Economic Welfare (ISEW) has been calculated in various ways for various countries and for various time spans. Based on the degree of objectivity, the Basic, Solid, and Site-specific ISEW are separated, whose sum constitutes the Total or Full ISEW. The paper proposes some guidelines for countries and smaller forms of state organizations, to apply and re-state their sustainable GDP, thus rendering it a useful figure as reported vis-à-vis the long established GDP. To demonstrate this theoretical advancement, the Turkish economy is used for an application. Turkey is a dynamic emerging economy, given its rapid GDP increase over the past two decades and the population increase on the one hand. On the other hand, it is afflicted by social inequalities and environmental problems, which if they were to be abated, they would certainly deduct from the increased income achieved so far.

Keywords: economic welfare; GDP; sustainability; ISEW; Turkey

JEL Classification: Q01; Q56; O53

1. Introduction

GDP was invented after the Great Depression and up to date has been widely used as a smart policy tool by economists and politicians. It is mainly calculated as the sum of personal consumption expenditure, government expenditure, net exports, and net capital formation. However, as it is today, it does not distinguish welfare improving activity from welfare reducing activity (Talberth et al. 2007). With the way that GDP has been used up to date, it has confounded growth with development (Costanza et al. 2009) or prosperity with growth (Jackson 2012). Sustainability concepts had been expressed quite early in the history of GDP. For example, Kuznet (1934) had first objected to the welfare of a nation being deduced only from GDP, because the latter measures together assets and consumer goods, using values that are based on the existing distribution of income, while also failing to include intangibles, such as negative or positive externalities. Referring to the same value of intangibles, Nordhaus and Tobin (1972) had reported the existence of activities beyond market transaction that also affected human and economic welfare, and they developed the Measure of Economic Welfare (MEW) as the forerunner of later measures of sustainable GDP, namely the Index of Sustainable Economic Welfare (ISEW), the Genuine Progress Indicator (GPI), or others. MEW did not contain environmental or social elements, and thus the need for another index persisted. The fundamental concept behind the ISEW is that a welfare measurement must rely on uncanceled costs and uncanceled benefits. For example, an increase in GDP that is caused by car crashes repairing outlays is cancelled by the damage caused to people (e.g., injuries and respective health costs). Experts will immediately see

the connection between the ISEW and the de-growth movement. The de-growth movement supports a transition towards a smaller economic system that will operate within ecological boundaries and social-economic changes that will increase genuine welfare (Buch-Hansen 2018; Germain 2017). On the other hand, the ISEW supports that growth differs from welfare. Thus, there are direct interlinkages between the two doctrines. The ISEW could fit in the discussion on the degrowth movement as becoming one of the fundamental pursuits in the degrowth framework.

In the 1990s, the ISEW was sometimes also called Genuine Progress Indicator, abbreviated as GPI (Lawn 2003). Currently, GPI is considered to be a version of the ISEW. Daly and Cobb (1989) had warned that national accounting treats the planet as a business in liquidation, to denote that nations did not care about building new values but only liquidating the existing resources. Daly and Farley (H. Daly and Farley 2004) also proposed the psychic dimension of welfare to refer to the subjective benefits and satisfactions that are derived from the socio-economic environment a person lives in. These subjective benefits can make a person feel satisfied even if the material means he lives with, are not of a high level or quality. Complementary to the realisation that there are more constituents of human welfare rather than only those measured by GDP, is Max-Neef's (1995) formulation that GDP increase keeps pace with welfare increase, only up to a point, beyond which, a decrease in welfare commences. All of this has been encapsulated in his theory of "threshold hypothesis".

According to Lawn (2003), the ISEW and the GPI were consistent with Fisher's distinction between income and capital and this Fisherian foundation must be credited to Daly too. The Fisherian conceptualization of income is different from the Hicksian one, mainly because the latter comprises current additions to human-generated capital, even if they create no welfare for the current period and it ignores important factors, such as income distribution, the benefit from unpaid job, the cost of crime, the cost of family breakdown, etc. (Lawn 2003). Fisher (1906) had noted that it is the consumption and not the production of goods that causes the welfare. This explains the fact that people do not gain satisfaction only from the goods produced in one year, but also from goods that have been produced in previous years, but their services are consumed in the current year.

Foremost, Daly and Cobb were the creators of sustainable economic welfare index (ISEW), which belongs to the class of measures that aim to adjust GDP by adding or subtracting the parts that stem from social or environmental considerations. Other indicators, such as, for example, the Human Development Index, aim to replace GDP. Others, such as the millennium development goals, aim to supplement GDP creating a dashboard perspective of indicators. The classification of indicators to those replacing, supplementing, or adjusting GDP is owned to Goossens et al. (2007), while Giannetti et al. (2015) divide indicators to those greening and socializing GDP and those that redefine indicators through environmental and social measures. Apparently, within the context of the second classification, the ISEW falls under the first group. Returning to the construction of the ISEW, this takes into account an inequality adjusted personal consumption and adds to it non-defensive public expenditure on education and health as well as the benefits of unpaid job and deducts damages on the environment and depreciation of natural capital.

Neumayer (2000) contests the ISEW both methodologically and theoretically; First, because the ISEW cannot claim to be measuring both welfare and sustainability simultaneously, since what affects welfare does not necessarily affect sustainability and vice versa. Second, he claims that the ISEW lacks theoretical foundations, because the selection of the variables and measurements are somewhat arbitrary and subjective. He particularly disapproved of the replacement cost method that was used to value the depletion of non-renewable resources, and thus explains why the ISEW is not an index of strong sustainability. Daly (1996), notwithstanding the right points made by Neumayer, remains a supporter of the ISEW, since according to him, GDP itself is also arbitrary and irrelevant when it comes to measure welfare. Even with a dose of skepticism, the ISEW, as well as the GPI (Costanza et al. 2004), could at least be safely used alongside a variety of other indicators.

Among the most recent succinct reviews of the ISEW with its various classifications and applications is provided in Gigliarano et al. (2014). Among the most recent ISEW applications in literature are

Beça and Santos (2014); Bleys (2008) Brennan (2013); Pulselli et al. (2012); and, Pulselli et al. (2006) With an interest in Portugal and United States of America (USA), Beça and Santos (2014) compare both the GDP and ISEW measures of economic welfare and show that the ISEW is more enlightening when it comes to aspects, such as resource use intensity and decoupling. Bleys (2008) provide an application with revised ISEW items for Belgium, but his results do not confirm the threshold hypothesis. Pulselli et al. (2012), Gigliarano et al. (2014), and Pulselli et al. (2006) produce Italian sub-national applications and were the first to inaugurate the calculation of the index at a subnational level in Europe. Other sub-national applications took place later in Flanders, France by Bleys (2008).

Sustainable development had already become in 1997 a fundamental objective in the European Union (European Commission 2016). Four years later, in Gothenburg Summit, was declared the first European Union (EU) sustainable strategy. Updates of this strategy took place in 2006 with a wide set of objectives, including: climate change and clean energy, sustainable transport, sustainable consumption and production, conservation of management of natural resources, public health, social inclusion, demography and migration, global poverty, and sustainable development challenges. The review of 2009 further highlights the urgent need for low carbon and low input economy. In 1999, at the Helsinki Summit, Turkey was recognized as a candidate for an EU membership. As a prospective European member in the future, it ought to share the same sustainability vision with Europe.

The novelty of this paper is both of methodological and of applied nature, and lies in the following: First, it proposes a classification of the components building the ISEW with the aim to contribute to the homogenization of the required data and calculation methods. Second, it calculates the ISEW for Turkey, a country for which the ISEW has not been calculated yet and which has demonstrated a remarkable, but disputable growth, in the past decade. Moreover, the study is of particular interest since Turkey is a candidate member for European Union (EU). Besides this introduction, the rest of this paper consists of three additional parts: part 2 (material and methods), part 3 (results and discussion), and part 4 (concluding remarks).

2. Material and Methods

2.1. The Turkish Economy and Society

In 1919, the Ottoman Empire dissolved and a part of it gave its place to the contemporaneous Turkish Republic, which was born in 1923 with Kemal Atatürk being the founder. A large series of changes took place due to his plans and interventions towards making a more secular state e.g., the switch to a Latin type alphabet from an Arabic one. Until the 1950s, Turkey never had a clear cut economic policy, but rather a fragmented ad-hoc solution provision to the various economic problems that had appeared (Krueger 1974). Turkey is today the world's 18th largest economy (World Bank 2014), but it remains an emerging market. Until the 1980s, Turkey has suffered from stagnation in living standards (Macovei 2009), because it was characterized by the heavy subsidization of agricultural products, low or negative factor productivity in the non-agriculture sector, high effective taxes, and rigidities in labor market that kept resources bound for too long in agriculture. The liberalization of the Turkish economy that started from 1990 and afterwards, was not accompanied by sound macroeconomic policies and institutional reforms (Gazi 2006). This resulted in various crises in the 1990s, worst of all in 2001 (Hakura 2013).

Analysts such as Ucer (2014) discern (sometimes with slight time differences) two distinctive phases in the recent Turkish economy. The first commences after the 2001 crisis and lasts until 2007–2008, and the second begins from 2008 and lasts up to date. The first is characterized by the removal of hindrances to foreign funds investment, which were invested in industry and large infrastructure. Banks conformed to European banking regulations, while the Central Bank was granted more independence with the aim to put inflation on a curb. All these reforms resulted in a period in which the Turkish economy was characterized by exceptional performance. In the second phase

though, the Turkish economy has slowed down and household indebtedness rose to almost 50%. From 2007 and thereafter, stagnation in both the GDP per capita and labor productivity was observed.

As far as the first crisis is concerned, namely in the 2000s: The 2000–2001 crisis was a result of the combination of political instability and the fact that the economy relied too much on foreign investment for its growth (Bibbee 2014). Despite the major structural problems characterizing the Turkish economy, the government was not able to cope with its deficits and could only do with selling high-interest bonds to Turkish banks (Bredenkamp et al. 2014). When foreign investors began to withdraw their funds from Turkey, as a result of the political turmoil, the Turkish government was not able to pay the banks back and they were left with huge capital deficits. Since the Turkish central bank stopped providing credit to domestic banks, the interbank rate soared to 873% (Brinke 2013). Short-term capital flows have been, and are still the main driving force of generating excessive fluctuations in the Turkish output (Özcan et al. 2006).

In 2000, the International Monetary Funds (IMF) intervened with a loan program equal to US\$10 billion to Turkey, while the latter was also compelled to embark on a huge privatization program for state-owned industries and tax increase. However, after a disagreement between top government officials about fighting corruption, a speculation attack against the Turkish lira started and lost 30% of its value against the American dollar. In 2001 the Turkish debt had peaked to 80% of GDP (Worldbank 2014b). The 2001 crisis was followed by a recovery due to the agreements that were made with the IMF, the preparations for EU accession and the reforms taking place within the country: the banking sector, labor sector, business, and trade liberalization. Macovei (2009) attributes the recovery occurring in 2002 and 2003 as a natural thing to occur after a severe recession, while Yeldan (2008) is critical of the jobless growth pattern, the high interest rates, the overvaluation of the Turkish currency, and the speculative-growth environment that is fostered in this economy.

In 2007, there was a slowdown in growth caused mainly by reform fatigue, political uncertainties, and the contractive monetary policy, which had as a result, the reduction of interest rates on which government insists (The Economist 2014). However, public debt reached reasonable levels in 2007 and a general government budget primary surplus during 2002–2007. This period is characterized as an “expansionary fiscal consolidation period”. Turkish lira appreciated in real terms. This generated the positive consequence of the reduction of debt/GDP ratio since most debt was denominated in a foreign currency. Turkey has been bequeathed with a volatile past and is accompanied by relatively high risk premium in foreign markets.

In 2009, Turkey was hit by global economic crisis and GDP contracted by a large amount, resulting in –4.8% annual growth. However, the aftermath of this crisis has not been the same as the one of 2001, because the economic environment was different at that time. First, after the 2001 crisis, the Turkish lira became unpegged from a fixed exchange regime to a flexible one. Also, its Central Bank engaged to countercyclical interest rate cuts that would also reduce inflation (Alp and Elekdag 2011). In 2009, the Turkish economy appeared to be more resilient and banks did not have the size of the problems that they had in 2001.

Turkey is characterized not only by income inequality in general, but in particular, by high regional differences and inequalities. It has also a low capital base per worker and a very low female work participation that is comparable only to that of MENA¹ countries. In 2011, the richest 20% of Turkish population had half of national income, while the poorest 20% had only 6% of the national income. These numbers quite eloquently illustrate the income inequality and differences in Turkey (Reuters 2012).

The huge growth experienced in the last two decades in Turkey has certainly caused serious environmental degradation. Also, energy pricing has encouraged the inefficient use of energy, which also increases the need for energy imports (EIA 2000). A comparison of the Turkish ecological footprint

¹ Middle East and North African region countries.

with its biocapacity reveals an ongoing unsustainable life in Turkey since the ecological footprint of consumption is 50% higher than the global bio-capacity per capita (Global Footprint Network 2014). In 2008, Turkey counted among the top five countries in the Mediterranean region, with the highest total ecological deficit of about 88.5 million gha² (UNESCO 2014). One major consequence of the population increase is the fact Turkey consumes its natural resources at a rate higher than they can be renewed. According to Levent (1999), Turkey, as most developing countries has been also characterized from unplanned urbanization and industrialization and has made wrong land management decisions. As a result of inefficient environmental management, the Turkish ecological footprint is determined at about 82% by personal consumption. Societal consumption is only 5% and investment consumption by government is 13%. The vast percentage of 82% is coming from personal consumption and consists mostly of food (52%) (Global Footprint Network 2014). It is easily deduced that the large demand on food puts croplands, grazing lands, and fishing areas under tremendous pressure. The rest of the ecological footprint in Turkey is dominated by personal transportation (15%) and many smaller categories, such as housing, services, etc. The change of economic policy orientation from an import economy of the 1980s to the export economy of today is also contributing to causing larger pressures on the environment (European Environmental Agency 2014).

Based on the OECD (2015), Turkey is below average in most economic and social figures. With regards to the means calculated by OECD countries, Turkey is below: by 16% in employment while Turkish people work longer by 1765 s per year, by 43% of population who have finished high-school, life expectancy is by 5% lower, the level of harming air pollutants is by 20.1% higher than the average of OECD countries, 24% more people are less satisfied with water quality, a smaller number of Turks (by 10% as compared to the mean OECD countries) believe that they have good neighboring relations and therefore somebody to turn to in case of need. A lower number of Turks (by 15%) declare themselves as happy people. All of the above presentation of Turkish economy and society is very important for the understanding of the proposed ISEW in the following sections and its discussion.

2.2. The Three-Level (Layer) ISEW

The ISEW studies become more sophisticated with time as they try to encompass as many dimensions of human welfare as possible, measured in as much an accurate way as possible (Bagstad et al. 2014). It is observed that for some of those dimensions, there are well established economic measures, while for some others, there is still controversy and debate. For example, it is noticed that all of the ISEW studies start with personal consumption that is weighted with a measure of income inequality—usually the Gini index, e.g., in Pulselli et al. (2006) and/or with an index for poverty, e.g., in Gigliarano et al. (2014). This is also because income inequality does not necessarily reveal much about poverty, since, for instance, two people can be unequal from an income perspective point of view, but still both of them can make ends meet and none of them lives in poverty.

Economic indicators, such as personal consumption, health or education expenditure, and capital growth are objectively and commonly measured for almost all countries and can be found in officially recognized databases, such as the Worldbank, OECD, Eurostat, UNESCO, and others. This paper terms this part of the ISEW as Basic ISEW. This is represented with the innermost cycle (or layer) in Figure 1 and it is the part of the ISEW whose measurement is homogeneous across countries and most studies in this field. That data are the easiest to find across all databases. Furthermore, these figures are reported on a regular basis, are transparent and most of them are data that are perused in the system of national accounts of each country and kept at the Central Bank of each country. Therefore, if the ISEW were to be calculated based only on this group of magnitudes, there would be little or no dispute

² Global hectare; measurement unit for the quantification of the ecological footprint or the biocapacity.

on the calculation of the ISEW. In such case, official databases could be reporting the “Basic ISEW” automatically, at the same frequency in which its constituent parts are reported.

Next, there is an additional part of the ISEW for which variables are slightly more difficult to find, and these variables, albeit having not been measured for all countries worldwide, they are however homogeneously measured. Examples of these variables are mineral depletion, forest depletion, energy depletion, CO₂ emission, or particles emissions damage, etc. This paper coins this part of the ISEW as Solid ISEW. This is represented with the middle cycle (or layer) in Figure 1. Not all of these variables are regularly reported and some countries systematically refrain from reporting them, either because of objective or subjective difficulties. For example, it is observed that all of the variables demanded for the calculation of this part of the index are not reported for Kosovo, Montenegro, and Serbia. These countries, albeit European, still suffer from a lack of infrastructures and organization, poor public administration, and lack of statistical data. Some countries may suffer from unstable political environments, which do not favor the monitoring and recording of data, or they prevent their publication for different reasons. Another group of countries for which most of the data in this group are not reported are, for example, Liechtenstein, Monaco, and San Marino. Albeit high-income countries, they may not have independent statistical agencies from their mother states, or they have statistical agencies that do not, for the moment, record data that are more difficult and expensive to keep.

Furthermore, many other poor and underdeveloped countries in Africa, Asia, and America do not offer these data and this is related to their underdevelopment and corruption. Another point that is worthy of underlining is that, although some countries report data falling within the group composing the Solid ISEW, they do not do that regularly. Much of the data that appear in international databases such as the World Development Indicators in Worldbank, come from the statistical agencies of their countries. If the latter do not report, international databases will not report either. Worldbank has committed itself to a global statistical strategy assisting national statistical agencies to escape the vicious circle of lack of funds, which lead to underinvestment in statistics and consequently lack of both data quality and quantity (Worldbank 2014a). Data gaps and discontinuities appear in Eurostat as well. Turkey, for example, does not offer at all, or offers in a fragmented way, many of the environmental data that are offered by most European countries. The amendment of European regulation Number 691/2011 on environmental economic accounts that took place on 2 April 2014 foresees the obligatory annual transmission of these data from member states to Eurostat (Eurostat 2014). Eurostat is also committed to construct estimates for countries not reporting.

Last, there are indicators that are evaluated at Willingness to Pay (WTP) or Willingness to Accept (WTA) prices. For WTP or WTA prices that have not been estimated for all countries, regions, or contexts, benefit transfers or cost transfers could be made. This part of the ISEW is the most difficult to calculate with a high degree of precision. It is nevertheless worth calculating even by approximation. Moreover, there are social problems that have not been measured for all countries and they do not involve the estimation of WTP/WTA prices, but they demand the keeping of very detailed and sophisticated micro-data panel. One such variable measurement is the cost of family breakdown after divorce. It involves costs, such as moving out of the house and renting another place for one of the spouses, counseling expenditure, and the cost from juvenile delinquency to which children of divorced families are often prone. However, such aggregates are costly to monitor and are compiled in high-income countries that are equipped with the infrastructures, expertise, and cultural sensitivity to collect that data. Furthermore, if such data exist in a country, the institutional framework to promote openness and transparency must exist too, so that researchers can reach them. This part of the ISEW is coined as Site-specific ISEW and it is represented by the outermost cycle (or layer) of Figure 1. Also, to use aggregate terms, the Basic ISEW will be further coined as 1st degree ISEW. The sum of the Basic and the Solid ISEW is further coined as 2nd degree ISEW, while the sum of Basic, Solid, and Site-specific ISEW is coined as 3rd degree ISEW or Total (Full) ISEW.

The Total (Full) ISEW encompasses all three layers of ISEW in Figure 1 and it is represented by the whole three-layer outermost cycle in Figure 1. Depending on the stage of development of a country, it is expected to find first layer (Basic ISEW) data in all countries, second layer data (Solid ISEW) in medium to high income countries, and third layer data (social data) only in the highest income countries. Understandably, the level of democracy also plays a role. Totalitarian regimes, for example, are not expected to provide neither second nor third layer data, and their data are not trusted. A crucial question is also raised for WTP prices (usually contained in 2nd or 3rd layer data), which have been set up through surveys that are taking place in countries different from the country for which there is interest in calculating the ISEW. Benefit or cost transfer can take place on the condition that certain requirements are fulfilled and countries have similarities that allow for the usage of a price that has been estimated for another country or market at national or sub-national level. Incompatible price transfers can cause an artificial huge discrepancy between the ISEW and GDP.

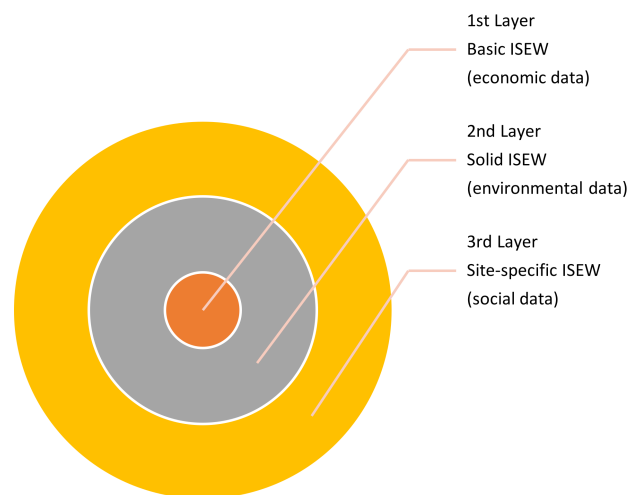


Figure 1. The three-level (layer) synthesis of the Total (Full) Index of Sustainable Economic Welfare (ISEW).

To avoid confusion and to reduce arbitrariness, the level of the ISEW calculated for each country can be the one that the available data allow. Only countries in which sophisticated social panels are available, typically the high income ones, can produce a Full ISEW. But, unless 3rd degree ISEWs can be constructed for most countries, no realistic comparisons can be made across countries, but only within countries themselves. Therefore, it cannot be decided whether a high income industrialized country, where people work a lot and keep themselves to themselves, is better off than a less developed country, where people have more leisure and enjoy neighbour relationships and more human contact. Nowadays, all countries can produce an ISEW of at least 1st degree, whilst most developed countries can produce an ISEW of at least 2nd degree. Up to date, this has been done in [Menegaki and Tsagarakis \(2015\)](#) for Greece, [Menegaki and Tugcu \(2017\)](#) for G7 countries, [Menegaki and Tugcu \(2016b\)](#) for emerging economies, [Menegaki and Tugcu \(2016a\)](#) for Sub-Saharan countries, and [Menegaki and Tiwari \(2017\)](#) for American countries. A lot of distance has to be covered until a 3rd degree ISEW becomes available on a comprehensive and exhaustive list of parameters for a wide number of countries.

2.3. The ISEW for Turkey

The ISEW is an aggregate indicator of human welfare consisting of elements that are already reflected in GDP and a series of positive and negative elements that are or are not contained in the GDP

but affect human welfare in a country (as shown in Table 1 and calculated in Tables 2–4). Based on the demonstration of the three-level ISEW in Section 2.2., the ISEW will be formally expressed as:

$$\text{Full ISEW} = (\text{Basic ISEW}) + (\text{Solid ISEW}) + (\text{Site-specific ISEW})$$

2.3.1. The Basic ISEW for Turkey

The Basic ISEW consists of tangible elements that have been measured following commonly accepted accounting standards and methods. Basic elements are usually provided for all the countries in international databases. The ISEW of first level thus typically contains the following items:

- (i) Personal consumption weighted for income inequality (Gini index) and poverty (they are specified as “people that cannot make ends meet”, which is provided by Eurostat). Personal consumption indicator is the market value of all goods and services, including durable products (such as cars, washing machines, and home computers), which are purchased by households. It excludes purchases of dwellings, but includes imputed rent for owner-occupied dwellings. It also includes payments and fees to governments to obtain permits and licenses (Item A),
- (ii) Public education expenditure minus 50% of it as defensive (Item B),
- (iii) Public Health expenditure minus 50% of it as defensive (Item C) and
- (iv) Net capital growth which consists of land improvements (fences, ditches, drains etc.); plant, machinery, and equipment purchases; the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, commercial, and industrial buildings, minus the replacement value of capital that is used up in the process of production (Item D).
- (v) Unpaid work is classified under the Basic ISEW as an economic variable. However, the number of unpaid workers is not always known with certainty. Second, the types and the degree of specialization is not reported, and hence we cannot apply the opportunity cost method to multiply each category of unpaid work with the wages that correspond to it. However, the minimum wages can be known with some certainty. Nevertheless, not all unpaid workers should be paid with minimum wages. Since there are not statistics to indicate how much of the unpaid work is of what type and multiply it with the corresponding opportunity cost, a replacement cost perspective is adopted in this calculation and the number of unpaid workers is multiplied with the minimum wages (Item E).

2.3.2. The Solid ISEW for Turkey

The Solid ISEW consists of elements that have been measured homogeneously and objectively with widely acknowledged methods, but the prices with which they have been multiplied to produce the cost that is represented by the variable, may be less objective. For example, Item I has been estimated as the WTP to avoid mortality from local pollution. WTP may be different from country to country, but the Worldbank specialists have produced this number for most countries worldwide in a homogeneous way. Therefore, it is regarded as appropriate to put this cost component under the Solid ISEW. These variables and their prices are provided by official databases, but the costs can be calculated with various alternative ways. These variables, together with the costs that they represent, are basically provided by official databases. These are:

- (vi) Mineral depletion (it is provided commonly by Worldbank for all countries, irrespective of whether it could be calculated in other acceptable ways too) (Item F).
- (vii) Energy depletion (Item G).
- (viii) Damage from CO₂ emissions or climate change damage (Item H).
- (ix) Damage from particulate emissions or localized pollution (Item I).

2.3.3. The Site-Specific ISEW for Turkey

The Site specific ISEW comprises mainly, but not exclusively, WTP or WTA prices, which are multiplied with objectively or subjectively measured variables that stand for social or environmental, positive, or negative externalities. Given the lack of publicly available Turkish data on most of the Items J-O, including them in the ISEW would entail making crude assumptions about them. Due to this reason, we will not estimate or add the 3rd layer ISEW to the 1st and 2nd layer ISEW for Turkey. The calculated ISEW for Turkey will only consist of the sum of the 1st and 2nd layer ISEW. This means that, in this occasion, the estimated Full ISEW for Turkey will consist only of data up to the 2nd degree ISEW, due to data lack. Also, there are variables whose cost has been recorded in some national or local official statistics office, but access to that data is limited. The range and the depth of data available for this level of ISEW, also depends on the progress and the establishment of the open data movement in a country.

Table 1. The ISEW components for Turkey, sign, calculation methods, and data sources.

| Component | Sign | Calculation Method | Source/Available from |
|---|------|---|--|
| 1. Adjusted personal consumption with durables | + | Personal consumption is multiplied and durables' expenditure (PC) with Gini coefficient (G) and poverty index (P) as: $PC \times (1 - G) \times (1 - P)$ | PC: http://data.worldbank.org/indicator/NE.CON.PRVT.CD Gini coefficient: http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_di12&lang=en Poverty index (inability to make ends meet): http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=ilc_mdcs09&lang=en |
| 2. Education expenditure | + | Public expenditure on education (current operating expenditures in education, including wages and salaries and excluding capital investments in buildings and equipment). Assuming that half of it is defensive, we multiply this amount with 50%. | http://data.worldbank.org/indicator/NY.ADJ.AEDU.CD We assume 1.4% private education and deprive it from total education expenditure http://www.oecd.org/edu/Turkey_EAG2013%20Country%20Note.pdf |
| 3. Health expenditure | + | Public health expenditure is also multiplied with 50% for the same reason as above. | http://data.worldbank.org/indicator/SH.XPD.PUBL.ZS |
| 4. Unpaid work | + | We have multiplied unpaid work (UW) as % of total labor force (TLF) with minimum annual wages (MAW) | UW: http://data.worldbank.org/indicator/SL.EMP.VULN.ZS TLF: http://data.worldbank.org/indicator/SL.TLF.TOTL.IN |
| 5. Net capital growth | ± | Data on fixed capital accumulation (FCA) have been used. Consumption of fixed (CFC) capital is subtracted to find the net capital and then calculated its growth rate. | FCA: http://data.worldbank.org/indicator/NE.GDI.FTOT.CD CFC: http://data.worldbank.org/indicator/NY.ADJ.DKAP.CD |
| 6. Mineral depletion | − | Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. | http://data.worldbank.org/indicator/NY.ADJ.DMIN.CD |
| 7. Energy depletion | − | It is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil, and natural gas. | http://data.worldbank.org/indicator/NY.ADJ.DNGY.CD |
| 8. Damage from CO ₂ emissions (climate change-long-run environmental damage) | − | It is estimated to be \$20 per ton of carbon (the unit damage in 1995 U.S. dollars) times the number of tons of carbon emitted. World bank estimations are based on Samuel Fankhauser's "Valuing Climate Change: The Economics of the Greenhouse" (1995). | http://data.worldbank.org/indicator/NY.ADJ.DCO2.CD |
| 9. Damage from particulate emissions (local pollution) | − | It is calculated as the willingness to pay to avoid mortality attributable to particulate emissions. | http://data.worldbank.org/indicator/NY.ADJ.DPEM.CD |

Table 2. Summary of results for the items building the ISEW from 2000 to 2012 in \$US.

| Items of the Full/Total ISEW for Turkey | | | | | | | |
|---|------|--|--------------------------------|--------------------------------|--------------------------------|-----------------------------------|-----------------------------------|
| Item | Sign | Year | 2000 | 2001 | 2002 | 2003 | 2004 |
| A | + | Private consumption weighted with Gini and Poverty indexes | 4.2×10^{10} | 3×10^{10} | 3.2×10^{10} | 4.5×10^{10} | 5.8×10^{10} |
| B | + | Public education expenditure | $7 \times 10^9 \times (1/2)$ | $5 \times 10^9 \times (1/2)$ | $6.1 \times 10^9 \times (1/2)$ | $8.2 \times 10^9 \times (1/2)$ | $1.1 \times 10^{10} \times (1/2)$ |
| C | + | Public Health expenditure | $8.3 \times 10^9 \times (1/2)$ | $6.8 \times 10^9 \times (1/2)$ | $8.8 \times 10^9 \times (1/2)$ | $1.1 \times 10^{10} \times (1/2)$ | $1.5 \times 10^{10} \times (1/2)$ |
| D | + | Unpaid work | 22.1×10^9 | 2.4×10^{10} | 1.9×10^{10} | 2.3×10^{10} | 3.4×10^{10} |
| E | ± | Net capital growth | 7.3×10^9 | -2.4×10^{10} | 7.5×10^9 | 9.4×10^9 | 1.8×10^{10} |
| F | − | Mineral depletion | 55.3×10^6 | 4.4×10^7 | 3.8×10^7 | 5.2×10^7 | 9.9×10^7 |
| G | − | Energy depletion | 3.9×10^8 | 2.8×10^8 | 2.7×10^8 | 3.4×10^8 | 4.7×10^8 |
| H | − | Damage from CO ₂ emissions | 1.4×10^9 | 1.3×10^9 | 1.4×10^9 | 1.6×10^9 | 1.7×10^9 |
| I | − | Damage from particulate emissions | 5×10^9 | 4×10^9 | 5×10^9 | 6.2×10^9 | 8.3×10^9 |
| | | Population | 6.3×10^7 | 6.4×10^7 | 6.5×10^7 | 6.5×10^7 | 6.6×10^7 |
| | | ISEW per capita | 1142.15 | 481.55 | 932.64 | 1206.21 | 1699.9 |
| | | GDP per capita | 4219.54 | 3057.79 | 3576.23 | 4595.29 | 5866.5 |

Table 3. Summary of results for the items building the ISEW from 2000–2012 in \$US.

| Items of the Full ISEW for Turkey | | | | | | | |
|-----------------------------------|------|--|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|-----------------------------------|
| Item | Sign | Year | 2005 | 2006 | 2007 | 2008 | 2009 |
| A | + | Private consumption weighted with Gini and Poverty indexes | 7.2×10^{10} | 7.8×10^{10} | 9.7×10^{10} | 1×10^{10} | 9.5×10^{10} |
| B | + | Public education expenditure | $1.3 \times 10^{10} \times (1/2)$ | $1.3 \times 10^{10} \times (1/2)$ | $1.6 \times 10^{10} \times (1/2)$ | $1.9 \times 10^{10} \times (1/2)$ | $1.6 \times 10^{10} \times (1/2)$ |
| C | + | Public Health expenditure | $1.7 \times 10^{10} \times (1/2)$ | $2.1 \times 10^{10} \times (1/2)$ | $2.6 \times 10^{10} \times (1/2)$ | $3.2 \times 10^{10} \times (1/2)$ | $3.1 \times 10^{10} \times (1/2)$ |
| D | + | Unpaid work | 3.6×10^{10} | 4×10^{10} | 3.8×10^{10} | 4.9×10^{10} | 4.4×10^{10} |
| E | ± | Net capital growth | 1.6×10^{10} | 1.8×10^{10} | 1.2×10^{10} | 1.7×10^{10} | -5.9×10^{10} |
| F | − | Mineral depletion | 2.1×10^8 | 4.8×10^8 | 7.8×10^8 | 8.6×10^8 | 6×10^8 |
| G | − | Energy depletion | 7.1×10^8 | 8×10^8 | 8.7×10^8 | 1.5×10^9 | 6.9×10^8 |
| H | − | Damage from CO ₂ emissions | 1.9×10^9 | 2.2×10^9 | 2.5×10^9 | 2.5×10^9 | 2.5×10^9 |
| I | − | Damage from particulate emissions | 1×10^{10} | 1.1×10^{10} | 1.3×10^{10} | 1.7×10^{10} | 1.4×10^{10} |
| | | Population | 6.7×10^7 | 6.8×10^7 | 6.9×10^7 | 7×10^7 | 7.1×10^7 |
| | | ISEW per capita | 1,878.12 | 2,053.74 | 2,185.93 | 2,539.09 | 1,190.97 |
| | | GDP per capita | 7,129.59 | 7,736.09 | 9,312.05 | 10,379.49 | 8,626.39 |

Table 4. Summary of results for the items building the ISEW from 2000–2012 in \$US.

| Items of the Full ISEW for Turkey | | | | | | | |
|-----------------------------------|------|--|-----------------------------------|-----------------------------------|-----------------------------------|--|--|
| Item | Sign | Year | 2010 | 2011 | 2012 | | |
| A | + | Private consumption weighted with Gini and Poverty indexes | 1.1×10^{10} | 1.1×10^{10} | 1.2×10^{10} | | |
| B | + | Public education expenditure | $1.9 \times 10^{10} \times (1/2)$ | $2 \times 10^{10} \times (1/2)$ | $2 \times 10^{10} \times (1/2)$ | | |
| C | + | Public Health expenditure | $3.7 \times 10^{10} \times (1/2)$ | $3.4 \times 10^{10} \times (1/2)$ | $3.6 \times 10^{10} \times (1/2)$ | | |
| D | + | Unpaid work | 4.6×10^{10} | 5.6×10^{10} | 4.8×10^{10} | | |
| E | ± | Net capital growth | 4.6×10^{10} | 3.7×10^{10} | -2.2×10^{10} | | |
| F | − | Mineral depletion | 1.1×10^9 | 1.6×10^9 | 1.5×10^9 | | |
| G | − | Energy depletion | 1×10^9 | 1.5×10^9 | 1.1×10^9 | | |
| H | − | Damage from CO ₂ emissions | 2.8×10^9 | 3.2×10^9 | 3.4×10^9 | | |
| I | − | Damage from particulate emissions | 1.6×10^{10} | 1.7×10^{10} | 1.8×10^{10} | | |
| | | Population | 7.2×10^7 | 7.3×10^7 | 7.3×10^7 | | |
| | | ISEW per capita | 2,957.78 | 2,953.61 | 2,045.21 | | |
| | | GDP per capita | 10,135.75 | 10,604.55 | 10,660.73 | | |

3. Results & Discussion

This part explains the observed differences between the conventional GDP and the ISEW. The latter is a measure of economic growth net of any defensive expenditure, which typically inflates GDP, but only after having damaged human welfare first. Equivalently put, economies should seek to increase their GDP with expenditures that are incurred for the good and not for redressing a human welfare harmful situation.

The reason a relatively short time period to study has been perused is due to the lack of publicly available data for Turkey for many of the constituent parameters of the ISEW. This corroborates the only recent evolution of Turkey towards opening to participations in international institutions and collaborations.

Due to objective hindrances that are explained in part 2.3.3, the Site-specific ISEW for Turkey has not been calculated in this paper. As a result of that, the sum of Solid ISEW, with the Basic ISEW compose the Full or Total ISEW per capita. In Figure 2, the lowest difference between GDP per capita and the Total ISEW per capita is noted in 2001 and the highest in 2012. The two slumps in 2001 and 2009 that were observed in all the magnitudes of Figure 2 correspond to the two economic crises analyzed in Section 2.1.

According to Figure 3, the largest fluctuations in the growth rate of Total of Full ISEW are injected by the Basic ISEW component. In 2002 and 2010, there are major fluctuations in growth rates in all magnitudes. These growth rates are observed immediately after the years the two crises were manifested. Mean annual GDP/capita growth rate is 9.43%, Total ISEW/capita growth rate is 17.7%, while for Basic ISEW/capita, it is 38.15%, and for the Solid ISEW/capita is the lowest 5.90%. Overall, the Full ISEW/capita growth is higher than the GDP/capita, and this growth is driven from the growth rate in Basic ISEW.

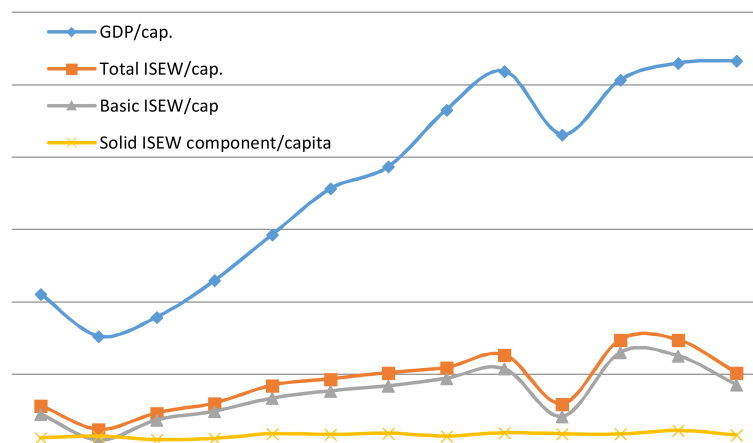


Figure 2. GDP per capita, the Basic ISEW, the Solid ISEW, and the Total or Full ISEW per capita in Turkey for the years 2001–2012 in \$US.

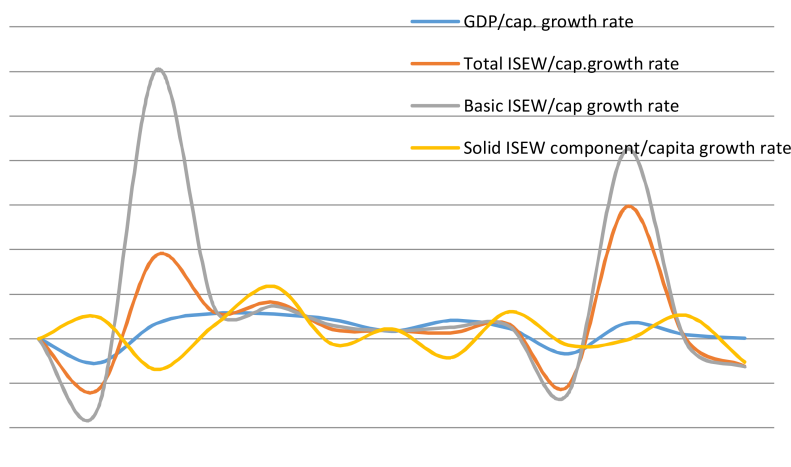


Figure 3. Growth rates in the Basic ISEW, Solid ISEW, the Total or Full ISEW, and the GDP/capita in Turkey for the years 2001–2012 in \$US.

As observed in Figure 3, in 2002 which is the year of a major economic crisis, whilst there is a peak in the growth rates of the Total or Full ISEW and the Basic ISEW components, there is a major decrease in Solid ISEW growth. This might be a reasonable crisis aftermath or a result of the state's attempt to retaliate the crisis with a steep increase in health, education, and new investments, accompanied however by deterioration of natural resources. A dissimilar pattern occurs in 2010, where high growth rates are observed for the Total ISEW and the Basic ISEW/capita, but no decrease is observed in the Solid ISEW growth. Also, from the year 2005 and after, the Solid ISEW is characterized by almost similar upward and downward fluctuations with a frequency of 2–3 years, which may indicate the occurrence of cycles in the economy. The adjusted personal consumption has the lion's share in the calculated ISEW due to the increased access of Turkish consumers on credit over the last few years.

As far as the Basic ISEW components annual growth rate is concerned (Figure 4), this is 11% for the adjusted consumption, 11% for the education expenditure, 14% for the health expenditure, and 102% for the net capital growth. Therefore, the highest mean annual growth is observed for the health expenditure. Net capital growth is negative for most of the years in the studied period, namely for the years 2001–2002, 2005, 2007, and 2009–2012. During the two economic crises in 2001 and 2012, the largest decline in GDP/capita is driven by consumption at a percentage of 28%. The corresponding decline in education and health expenditures in 2001 is 29% and 17%, respectively.

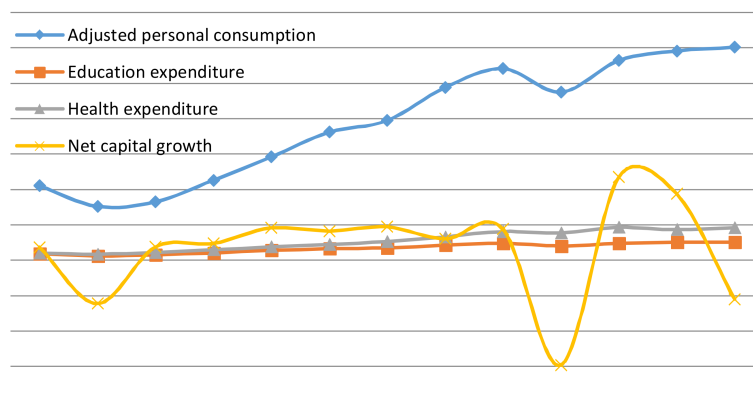


Figure 4. Components of the Basic ISEW in Turkey for the years 2001–2012 (in \$US).

Net capital growth decline is 434%. In 2010, the decrease in consumption, education, and health expenditure is also lower: 12%, 16%, and 4%. Net capital growth becomes negative in 2001 and then stabilizes to zero, which means that Turkey is an economy in great need of infrastructure renovation. Although large projects have taken place in the last decade (roads, bridges, ports, airports, etc.), Turkey is a vast country and there is plenty of room for the construction of additional infrastructure.

Public health expenditure (consisting of recurrent and capital spending from the state budget and social health insurance funds) has been adjusted by 50%. Apparently, it follows a relatively steady path, albeit the Turkish population has been increasing. While, in 1990, Turkey was below the average upper middle income countries in life expectancy at birth, infant mortality rate, and child mortality rate, in 2010, it supersedes this average. Moreover, Turkey is below the average number reported (by upper middle income countries) in the numbers of physicians, nurses and midwives and hospital beds per 1000 people. However the percentage of public health expenditure is higher than the average, while the out of pocket money for health is lower, meaning that health is mainly left to the state to take care of.

The almost stable health expenditure with an increasing population means either a shortage in proper health care or a better organization which allocates these costs in a better way. According to the [World Health Organization \(2013\)](#), it is attributed to the latter: “A system called performance-based supplementary payment for family physicians and key hospital personnel was implemented in order to reward productivity, and the provision of high impact health services at primary level is ensured for family physicians ...”. Regarding education expenditure, it follows an increasing trend after a fall of about 26% and

11% in 2001 and 2009, respectively. Poor education is recognized as one of the structural weaknesses characterizing Turkey ([The Economist 2013](#)), although the number of teachers has risen by 350,000 within a decade.

Net capital is the difference between capital formation (or domestic fixed investment) minus the consumption or depreciation of that capital. The former includes land improvements, machinery, equipment, roads construction, railways, schools, hospitals, houses, industrial buildings, etc. The consumption of capital is the replacement value of the capital that is used. When net capital is high and increasing, this shows a vibrant economy with a lot of new investments and a country with continuously modern infrastructure. The degree with which this magnitude increases reveals the strength and robustness of the economy. This is quite meager for the Turkish economy.

The mean annual growth rate in the number of unpaid workers, minimum monthly wages, and the values of unpaid work, which is the product of the two previous magnitudes, is: -1% , 6% , and 8% , respectively. Unpaid annual workers are constantly decreasing throughout the studied period. In 2000 it was 46.3% of total labor force, while in 2012, it was diminished to 32.1% . This relates to the fact that more Turkish women are working outside home in paid jobs. The increase in minimum wages is connected to the improved productivity, the rigidities in the labor sector and the demand for labor, which is the result of the increased GDP growth and the fact that numerous foreign companies have started operations in Turkey.

As far as the deterioration in natural resources is concerned, CO_2 damage is the highest, followed by energy depletion and mineral depletion (Figure 5). Energy depletion is falling during the years 2011–2012 at a higher rate than mineral depletion. While energy and mineral depletion are marked by a slump in 2009, which is a year of crisis, CO_2 damage is steadily increasing or it stays constant in the year 2009. This shows that CO_2 damage is more resilient in a recession when compared to other types of environmental degradation.

Non-renewables' depletion follows an increasing, but low cost path, as compared to other costs in Figure 5. Turkey is rich in minerals (gold, zinc, iron, copper, nickel, etc.), but has also developed the exploitation of various sources of renewable energy ([Menegaki and Gurluk 2013](#)) and hosts significant natural gas pipeline infrastructure ([Menegaki 2011](#)). Carbon dioxide emissions damage is estimated at \$20 per ton of carbon ([WorldBank 2014c](#)). While this was 1.4 billion \$ in 2000, it escalated to 3.4 billion \$ in 2012. Turkey has co-signed the Kyoto protocol in 2009, but had not taken part in the Annex B countries list because it had not signed with the initial participants, and therefore has no responsibility for the emissions in the first period of the protocol. The latter covers the period 2008–2012, and therefore we cannot observe any reduction in emissions within this period ([Duzgun and Kiraci Law Office 2011](#)).

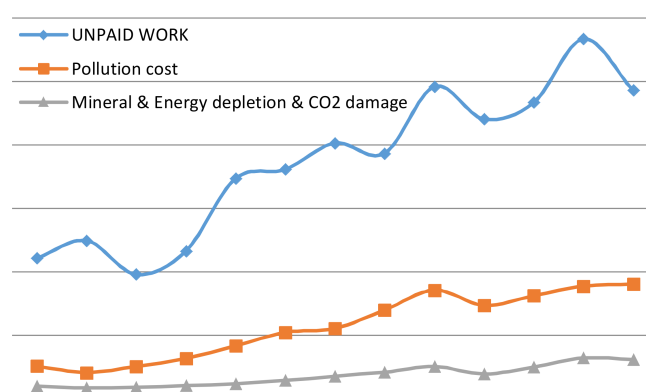


Figure 5. Components of the Solid ISEW³ for Turkey for the years 2001–2012 (in \$US).

³ Please refer to Sub-Section 2.3.1 for the reason of placing the unpaid work under the Solid ISEW in this paper.

Albeit in Figure 2, an almost straight Solid ISEW line and a steadily increasing Basic ISEW line are observed (with the exceptions of 2001 and 2009), on first sight a positive view on the GDP growth sustainability achieved in the Turkish economy might be gained. However, the Solid ISEW negative components keep rising (Figure 6), which means that the costs and problems afflicting society and causing them are not under control in this country. On the other hand, the only Solid ISEW positive component, e.g., unpaid work⁴, also assumes an increasing trend, which strengthens the above mentioned argument. On the other hand, the Basic ISEW components follow increasing trends with the exception of net capital growth. Even with this limited version of the Total or Full ISEW (as a sum of the Basic and Solid ISEWs) for Turkey, it must be pinpointed that unless negative components are stabilized or reduced, the increase in positive elements must be such as to offset the increase of the negative components.

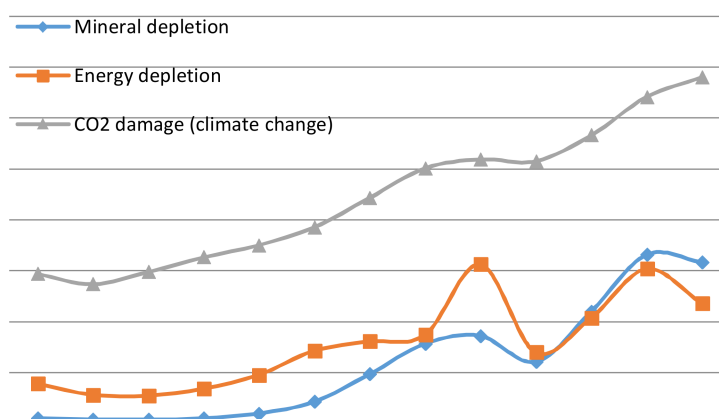


Figure 6. Time allocation of mineral depletion, energy depletion and CO₂ damage in Turkey (years 2000–2012 in \$US).

4. Concluding Remarks

Quite early after the establishment of GDP as a measure of national income, economists realized the narrow perspective of this indicator, given that there is a variety of economic and social aspects that must be taken into account in order to measure the human welfare that people enjoy in a country or their psychic income. The Index of Sustainable Economic Welfare (ISEW) is one such indicator. The ISEW has been calculated for only a few countries and there is scope for many more in the future, as more of the variables that must be taken into account are calculated. For example, there is ample scope for the estimation of WTP prices that are necessary to calculate the benefit and cost items constituting the ISEW. Turkey is one such country, and therefore particular care is needed for special components of the constructed ISEW. This is meant to suggest that research should start on the valuation of environmental and social problems in Turkey, as is widely done in many other developed countries. Only in this way can the responsible statistical agencies and other international databases be informed.

Based on the nature of the variables that are necessary for the construction of the ISEW, the ISEW has been separated into: the Basic ISEW, the Solid ISEW, and the Total or Full ISEW as the sum of Basic and Solid ISEWs. The Basic ISEW contains variables, such as the weighted private expenditure, health expenditure, education expenditure, net capital growth, and (under certain circumstances) unpaid work. Their common characteristic is that these variables are objectively measured by all countries in a common way and they are reported in international databases. The Solid ISEW contains

⁴ Please consult Sub-Section 2.3.1 for placing the unpaid work under the Solid ISEW.

mostly environmental variables, such as mineral depletion, energy depletion, damage from particulate, and CO₂ emissions. These variables are more complicated in their calculation than the ones included in the Basic ISEW and they are more difficult to find them reported in all countries. Also, their calculation can take place with various ways and methods, and hence there can be an element of subjectivity, but again most of them are published in international databases.

Last, the Site-specific ISEW contains components whose value is calculated in a more subjective way, due to the fact that these values may rely often on WTP or WTA values that have not been calculated in all countries, and hence some form of benefit or cost transfer must take place first. Among these cost and benefit dimensions are: water pollution, noise pollution, road fatalities, homicides, divorce-family breakdown, and commuting. The Total or Full ISEW thus consists of the sum of the three: the Basic, the Solid, and the Site-specific ISEW. The Basic ISEW is alternatively termed as 1st degree ISEW. The 2nd degree ISEW consists of the sum of the Basic and the Solid ISEW, while the 3rd degree ISEW is equivalent to the Total ISEW containing all the possible economic, environmental, and social data. Even if some countries manage to produce these numbers for themselves, there is no institutional framework with uniform guidelines that will be able to make them comparable across countries. For example, the situation can be easily perceived when one compares the number of economic valuation studies across countries. In some countries they are flourishing, and in some others they are virtually non-existent.

Within the studied period, the Total or Full ISEW per capita is by \$2576 (in 2001) to \$8615 (in 2012) lower than GDP/capita in Turkey, and it is positive and increasing. Therefore, taking into account the Basic ISEW and the Solid ISEW components only, the Turkish economy appears to be on a sustainable path. However, this view is very restrictive, since the Site-specific ISEW part has not been calculated due to lack of publicly available reliable data. This also explains why the different up-to date ISEWs cannot be compared worldwide. Since there are various ISEW degrees and particularly the 3rd degree ISEW (=Full or Total ISEW) may contain a vast number of parameters subjectively calculated, this entails the non-comparability of the various ISEWs across countries unless they are uniformly estimated by the same international organization.

Turkey has a high growth potential. In the years to come, it must pay attention to growth through more sophisticated sources, such as technology and human capital improvements. Labor will be educated to provide highly sophisticated products besides services. Indigenous saving must increase because it currently depends at a large degree on foreign funds that are not guaranteed to remain within Turkey, particularly at periods of crisis. Provision of motives to keep indigenous funds invested within the country, will reduce the dependence on mobile foreign reserves. Strengthening of the institutions and corruption elimination will bring Turkey closer to EU accession. The EU accession may be able to give a cause for additional reforms and this is an opportunity that must be reaped by Turkish governments. EU directives on environment and societal issues will enhance Turkish society and will reduce inequalities and poverty and will increase environmental awareness. Volatile GDP growth, low savings rates, growing external imbalances, and persistent unemployment are some of the problems that Turkey must tackle in the future to make a build a more sustainable GDP.

Conflicts of Interest: The author declares no conflict of interest.

References

- Alp, Harun, and Selim Elekdag. 2011. The Role of Monetary Policy in Turkey during the Global Financial Crisis, IMF Working Paper WP/11/150. Available online: <https://www.imf.org/external/pubs/ft/wp/2011/wp11150.pdf> (accessed on 19 September 2014).
- Bagstad, Kenneth J., Günseli Berik, and Erica J. Brown Gaddis. 2014. Methodological developments in US state-level Genuine Progress Indicators: Toward GPI 2.0. *Ecological Indicators* 45: 474–85. [CrossRef]
- Beça, Pedro, and Rui Santos. 2014. A comparison between GDP and ISEW in decoupling analysis. *Ecological Indicators* 46: 167–76. [CrossRef]

- Bibbee, Alexandra. 2014. Turkey's Crisis, OECD Observer. Available online: http://www.oecdobserver.org/news/archivestory.php/aid/435/Turkey\T1\textquoterights_crisis.html (accessed on 19 September 2014).
- Bleys, Brent. 2008. Proposed changes to the Index of Sustainable Economic Welfare: An application to Belgium. *Ecological Economics* 64: 741–51. [CrossRef]
- Bredenkamp, Hugh, Mats Josefsson, and Carl-Johan Lindgren. 2014. Turkey's Renaissance: From Banking Crisis to Economic Revival. Available online: http://www.tepav.org.tr/upload/files/haber/1255418791r8590.Turkey\T1\textquoterights_Renaissance_From_Banking_Crisis_to_Economic_Revival.pdf (accessed on 14 September 2014).
- Brennan, Andrew John. 2013. A critique of the perceived solid conceptual foundations of ISEW and GPI—Irving Fisher's cognisance of human-health capital in 'net psychic income'. *Ecological Economics* 88: 159–66. [CrossRef]
- Brinke, Koen. 2013. The Turkish 2000-01 Banking Crisis. Available online: <https://economics.rabobank.com/publications/2013/september/the-turkish-2000-01-banking-crisis> (accessed on 14 September 2014).
- Buch-Hansen, Hubert. 2018. The Prerequisites for a Degrowth Paradigm Shift: Insights from Critical Political Economy. *Ecological Economics* 146 (SC): 157–63. [CrossRef]
- Costanza, Robert, Jon Erickson, Karen Fligger, Alan Adams, Christian Adams, Ben Altschuler, Stephanie Balter, Brendan Fisher, Jessica Hike, Joe Kelly, and et al. 2004. Estimates of the Genuine Progress Indicator (GPI) for Vermont, Chittenden County and Burlington, from 1950 to 2000. *Ecological Economics* 51: 139–55. [CrossRef]
- Costanza, Robert, Maureen Hart, Stephen Posner, and John Talberth. 2009. Beyond GDP: The Need for New Measures of Progress, The Pardee Papers, No. 4. January. Available online: <http://www.bu.edu/pardee/files/documents/PP-004-GDP.pdf> (accessed on 26 July 2014).
- Daly, Herman E. 1996. *Beyond Growth: The Economics of Sustainable Development*. Boston: Beacon Press.
- Daly, Herman E., and John B. J. Cobb. 1989. *For the Common Good: Redirecting the Economy toward Community, the Environment and a Sustainable Future*. Boston: Beacon Press.
- Daly, Herman, and Joshua Farley. 2004. *Ecological Economics-Principles and Applications*. Washington: Island Press, p. 449. Available online: http://indomarine.webs.com/documents/Ecological_Economics_Principles_And_Applications.pdf (accessed on 8 December 2016).
- Duzgun and Kiraci Law Office. 2011. Turkey and Emission Reduction. Available online: <http://www.mondaq.com/turkey> (accessed on 22 September 2014).
- EIA. 2000. Turkey: Environmental Issues. Available online: <http://www.nuce.boun.edu.tr/turkey.html> (accessed on 20 September 2014).
- European Commission. 2016. Sustainable Development. Available online: <http://ec.europa.eu/environment/archives/eussd/index.htm> (accessed on 25 April 2017).
- European Environmental Agency. 2014. Country Profile—Distinguishing Factors (Turkey). Available online: <http://www.eea.europa.eu/soer/countries/tr/country-introduction-turkey> (accessed on 4 October 2014).
- Eurostat. 2014. Eurostat Database. Available online: <http://ec.europa.eu/eurostat> (accessed on 1 October 2014).
- Fisher, Irving. 1906. *Nature of Capital and Income*. New York: Macmillan.
- Gazi, E. 2006. Globalization and the Turkish Economy. Available online: <http://www.vanderbilt.edu/econ/conference/gped-conference-06/papers/ercel.pdf> (accessed on 10 September 2014).
- Germain, Marc. 2017. Optimal Versus Sustainable Degrowth Policies. *Ecological Economics* 136 (SC): 266–81. [CrossRef]
- Giannetti, B.F., F. Agostinho, C.M.V.B. Almeida, and D. Huisingh. 2015. A review of limitations of GDP and alternative indices to monitor human wellbeing and to manage eco-system functionality. *Journal of Cleaner Production* 87: 11–25.
- Gigliarano, Chiara, Francesco Balducci, Mariateresa Ciommi, and Francesco Chelli. 2014. Going regional: An index of sustainable economic welfare for Italy. *Computers, Environment and Urban Systems* 45: 63–77. [CrossRef]
- Global Footprint Network. 2014. Executive Summary: Turkey's Ecological Footprint Report. Available online: http://www.footprintnetwork.org/images/uploads/Turkey_Ecological_Footprint_Report_Executive_Summary-Conclusion.pdf (accessed on 4 October 2014).
- Goossens, Yanne, Arttu Mäkipää, Philipp Schepelmann, Isabel van de Sand, Michael Kuhndt, and Martin Herrndorf. 2007. Alternative Progress Indicators to Gross Domestic Product (GDP) as a Means towards Sustainable Development. Available online: <http://www.pedz.uni-mannheim.de/daten/edz-ma/ep/07/EST19990.pdf> (accessed on 28 March 2018).

- Hakura, Fadi. 2013. After the Boom: Risks to the Turkish Economy. Available online: http://www.chathamhouse.org/sites/files/chathamhouse/public/Research/Europe/0813bp_turkey.pdf (accessed on 15 September 2014).
- Jackson, Tim. 2012. *Prosperity without Growth: Economics for a Finite Planet*. London: Routledge.
- Krueger, Anne O. 1974. Chapter 1-The Turkish Economy and Its Growth: An Overview. Available online: <http://www.nber.org/chapters/c4106.pdf> (accessed on 19 September 2014).
- Kuznet, Simon. 1934. *National Income 1929–1932; A Report to the U.S. Senate, 73rd Congress, 2nd Session*; Washington: US Government printing office.
- Lawn, P. A. 2003. A theoretical foundation to support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and other related indexes. *Ecological Economics* 44: 105–18. [CrossRef]
- Levent, Tüzün Baycan. 1999. The Problems of Environment, Development and Planning in Turkey. Available online: <http://www.sre.wu-wien.ac.at/ersa/ersaconfs/ersa99/Papers/a277.pdf> (accessed on 4 October 2014).
- Macovei, Mihai. 2009. Growth and Economic Crisis in Turkey: Leaving behind a Turbulent Past. Available online: http://ec.europa.eu/economy_finance/publications/publication16004_en.pdf (accessed on 14 September 2014).
- Menegaki, Angeliki N. 2011. Bourgas-Alexandroupolis oil pipeline; will matching institutional and regulatory contexts lead to an effective bargaining and eventual consensus? *Energy Policy* 39: 1277–85. [CrossRef]
- Menegaki, Angeliki N., and Serkan Gurluk. 2013. Greece & Turkey; assessment and comparison of their renewable energy performance. *International Journal of Energy Economics and Policy* 3: 367–83.
- Menegaki, Angeliki N., and Aviral Kumar Tiwari. 2017. The index of sustainable economic welfare in the energy-growth nexus for American countries. *Ecological Indicators* 72: 494–509. [CrossRef]
- Menegaki, Angeliki N., and Kostantinos P. Tsagarakis. 2015. More indebted than we know? Informing fiscal policy with an index of sustainable welfare for Greece. *Ecological Indicators* 57: 159–63. [CrossRef]
- Menegaki, Angeliki N., and Can Tansel Tugcu. 2016a. Rethinking the energy-growth nexus: Proposing an index of sustainable economic welfare for Sub-Saharan Africa. *Energy Research and Social Science* 17: 147–59. [CrossRef]
- Menegaki, Angeliki N., and Can Tansel Tugcu. 2016b. The sensitivity of growth, conservation, feedback & neutrality hypotheses to sustainability accounting. *Energy for Sustainable Development* 34: 77–87.
- Menegaki, Angeliki N., and Can Tansel Tugcu. 2017. Energy consumption and sustainable welfare in G7 countries: A comparison with the conventional nexus. *Renewable and Sustainable Energy Reviews* 69: 892–901. [CrossRef]
- Neumayer, E. 2000. On the methodology of ISEW, GPI and related measures: Some constructive suggestions and some doubt on the ‘threshold’ hypothesis. *Ecological Economics* 34: 347–61. [CrossRef]
- Nordhaus, William, and James Tobin. 1972. Is growth obsolete? In *Economic Growth, National Bureau of Economic Research*. Series, No 96E; New York: Columbia University Press.
- OECD. 2015. Better Life Index. Available online: <http://www.oecdbetterlifeindex.org/countries/turkey/> (accessed on 2 January 2015).
- Özcan, K.M., Ü. Özlale, and Ç. Sarıkaya. 2006. Chapter 8—Sources of Growth and the Output Gap for the Turkish Economy. In *Contributions to Economic Analysis*. Edited by J.B. Nugent and M. Hashem Pesaran. Amsterdam: Elsevier, vol. 278, pp. 237–66.
- Pulselli, Federico M., Francesca Ciampalini, Enzo Tiezzi, and Carlo Zappia. 2006. The index of sustainable economic welfare (ISEW) for a local authority: A case study in Italy. *Ecological Economics* 60: 271–81. [CrossRef]
- Pulselli, Federico M., Mirko Bravi, and Enzo Tiezzi. 2012. Application and use of the ISEW for assessing the sustainability of a regional system: A case study in Italy. *Journal of Economic Behavior and Organization* 81: 766–78. [CrossRef]
- Reuters. 2012. As Turkey’s Economy Booms, Deep Inequality Persists. Available online: <http://www.reuters.com/article/2012/11/28/turkey-unemployment-idUSL5E8MGBB420121128> (accessed on 19 September 2014).
- Talberth, J., C. Cobb, and N. Slattery. 2007. *The Genuine Progress Indicator 2006: A Tool for Sustainable Development*. Oakland: Redefining Progress.
- The Economist. 2013. Strong but Vulnerable: The Turkish Economy. Available online: <https://www.economist.com/news/europe/21579491-turkey-remains-highly-exposed-loss-confidence-foreign-investors-strong-vulnerable> (accessed on 22 September 2014).
- The Economist. 2014. The Mask If Off. Available online: <https://www.economist.com/news/finance-and-economics/21593496-political-turmoil-exposes-economic-malaise-mask> (accessed on 17 September 2014).

- Ucer, Murat. 2014. Turkey's Economy: Now for the Hard Part. Available online: <http://foreignpolicy.com/2014/08/12/turkeys-economy-now-for-the-hard-part/> (accessed on 17 September 2014).
- UNESCO. 2014. Mediterranean Ecological Footprint Trends. Available online: https://www.footprintnetwork.org/content/images/article_uploads/Mediterranean_report_FINAL.pdf (accessed on 4 October 2014).
- World Bank. 2014. Turkey Overview. Available online: <http://www.worldbank.org/en/country/turkey/overview> (accessed on 18 September 2014).
- World Health Organization. 2013. Country Co-Operation Strategy at a Glance: Turkey. Available online: http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_tur_en.pdf (accessed on 22 September 2014).
- Worldbank. 2014a. Global Statistical Strategy. Available online: <http://data.worldbank.org/about/data-overview/global-statistical-strategy> (accessed on 1 November 2014).
- Worldbank. 2014b. Reducing Public Debt: Turkey. Available online: <http://siteresources.worldbank.org/ECAEXT/Resources/258598> (accessed on 19 September 2014).
- WorldBank. 2014c. Worldbank Development Indicators. Available online: <data.worldbank.org/data> (accessed on 1 February 2014).
- Yeldan, Erinç. 2008. Turkey and the Long Decade with the IMF. Available online: <http://www.brettonwoodsproject.org/2008/06/art-561814> (accessed on 19 September 2014).



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