

The Impacts of the COVID-19 Pandemic on National Economic Welfare: The Genuine Progress Indicator for Iceland

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This study assesses the economic impacts of the COVID-19 pandemic in Iceland using the Genuine Progress Indicator (GPI), an alternative macroeconomic measure that incorporates environmental and social externalities omitted from GDP. It updates Iceland's GPI from 2000–2023, with primary focus on the pandemic period (2019–2023), based on a methodology comprising 28 sub-indicators. Key findings reveal contrasting trends. While GDP fell by 6.0% in the pandemic's first year, the GPI showed sustained welfare levels. Government investments in education, health-care, and infrastructure more than offset rising social costs (mainly from unemployment) and declining environmental costs (notably reduced non-renewable resource use and greenhouse gas emissions). Following the full lifting of travel restrictions in 2022 and the tourism boom, both indicators rebounded strongly in 2022 and 2023. The GPI grew by 12.7% and 6.8%, while GDP increased by 18.7% and 11.0%. The results provide indications of Iceland's economic resilience during crisis and recovery.

Keywords: economic welfare, alternative measure, genuine progress, Iceland, pandemic

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Introduction

The COVID-19 pandemic unleashed multiple negative economic consequences, affecting economies of all scales and types (Delardas et al. 2022; Hong et al. 2023; Martin et al. 2020; Segal and Gerstel 2020). Median global Gross Domestic Product (GDP) reduced by 3.9% from 2019 to

2020, the greatest year-on-year decline since the Great Depression (International Monetary Fund 2021). The World Economic Forum (2020) described interconnected economic risks at the micro and macro levels, which included increased bankruptcies, prolonged recessions, high levels of unemployment, diminished fiscal positions, and disruptions to global supply chains. Reported systemic effects of the pandemic included, but were not limited to, destabilised tourism and hospitality sectors (Joo and Mir 2024), reduced food security (Nechifor et al. 2021), increased poverty (Decerf et al. 2021), increased inequality (Mahler et al. 2022), and diminished animal welfare and livestock supply chain sustainability (Hashem et al. 2020). Such risks were prevalent in developing nations and considered to be very common in remote and nature-dependent states, such as those in the Arctic (e.g. Greenland), which typically rely greatly on global connectivity for trade and tourism (Cook and Jóhannsdóttir 2021; Larsen and Petrov 2026; Peterson et al. 2023).

The shortcomings of using standard macroeconomic statistics, such as GDP, to measure economic welfare and societal progress have been well-described in the academic literature for many years (Coscieme et al. 2020; Costanza, Fioramonti et al. 2016; Costanza, Daly et al. 2016; Coyle 2015; Hoekstra 2019; Kubiszewski et al. 2013). The various limitations of the metric are valid regardless of the connotations of a pandemic. However, its deficiencies merely become starker amidst a seismic shock with global manifestations, many of which constitute non-market effects. In recent years there has been acknowledgement of the need to ‘move beyond GDP’ and utilise alternative or complementary tools to capture the broader implications of economic activity, including the positive contributions of voluntary work and leisure time, and the negative effects of income inequality, pollution, non-renewable resource depletion and crime, among other factors (Stiglitz et al. 2018; Hoekstra 2019; van den Bergh 2022). Coscieme et al. (2020, 6) called for ‘further macro-economic indicators that internalize social and environmental externalities’. This imperative has also been partially acknowledged within the United Nations’ Sustainable Development Goals (SDGs), wherein Target 19 of SDG 17 (Partnerships for the goals) demands the use of measurements of progress on sustainable development that complement GDP (United Nations 2015).

The Genuine Progress Indicator (GPI) is a popular ‘beyond GDP’ measure of economic welfare that has been calculated at the national, state and city level over the past three decades (Bagstad et al. 2014; La-

zarus and Brown 2022; Malinauskaite et al. 2026). It strives to provide 'a monetary measure of economic welfare for a given population in a given year that accounts for benefits and costs experienced by that population in association with investment, production, trade, and consumption of goods and services' (Talberth and Weisdorf 2017, 142). As far as the authors are aware, to date only one prior national GPI study in the published academic literature has sought to evaluate the impacts of the COVID-19 pandemic on the GPI and compared those outcomes to GDP, which was the Australian calculation by Karatopouzis et al. (2022), focused on the first six months of 2020.

The case study of the Icelandic GPI is used for the purposes of the analysis presented in this study, as this island nation provides a representative example of several of the international economic challenges caused by the COVID-19 pandemic – a sudden contraction in GDP, significantly increased unemployment, especially in tourism and related service industries, and disruptions to supply chains (Cook and Jóhannsdóttir 2021; Joo and Mir 2024; Marino and Pariso 2021; World Economic Forum 2020). In addition, the sensitive and turbulent recent history of the small and geographically isolated Icelandic economy (Duhs 2021; Halldórsdóttir et al. 2024) makes it well-suited for studying the impacts of macroeconomic shocks playing out on a global scale. A banking and currency value collapse in 2008 precipitated a tourism boom which, at one point, led to the nation having an annual GDP growth rate of 7.2%, the highest among all OECD members in 2016 (OECD 2017; Loftsdóttir 2018). More recently, restrictions on international movement caused by the COVID-19 pandemic led to the collapse of Iceland's tourism sector (OECD 2021; Sigurðardóttir 2020), which, after restrictions on international entrants were fully lifted, rallied strongly again during Q3 of 2022 (Iceland Chamber of Commerce 2022), reaching a record high in terms of international tourism consumption in 2023 (Statistics Iceland 2023).

This study seeks to evaluate the following research questions:

1. How do Iceland's GDP and GPI outcomes compare during the entire assessment period of 2000–2023?
2. What are the macroeconomic implications of the COVID-19 pandemic on national economic welfare during the specific period 2019 to 2023?
3. Which government interventions helped to mitigate the negative economic welfare consequences of the COVID-19 pandemic?

4. To what extent was Iceland's economic performance and management during the period 2019 to 2023 demonstrative of 'degrowth'?

Regarding the first research question, the decision to also evaluate across the longer time span of 2000–2023 in this study was motivated by two considerations. Firstly, this period also captures some of the turbulence of the Icelandic economy, such as the financial collapse of 2008, enabling an examination of how this shock played out with respect to both GDP and the GPI, and how it compared to the impacts of the COVID-19 crisis. Secondly, the longer time span enables us to observe the expansion in the Icelandic economy in the years up to 2019, the last year before the COVID-19 pandemic started, providing a standard for appraising the swiftness of the rebound in 2022 and 2023. In so doing, the study appraises both economic welfare (current levels of prosperity) through the GPI as well as the capacity for economic resilience, which includes the ability to withstand shocks and rebound. The focus of the explorative fourth research question on economic degrowth is motivated partly by calls in the international literature for the degrowth of carbon intensive sectors, such as tourism, in the aftermath of the COVID-19 pandemic, following observations of the decline in this sector's emissions during its incidence (Fletcher et al. 2020; Butcher 2023).

This article is organised as follows. The second section provides a brief overview of the impacts of the COVID-19 pandemic in Iceland. In the third section, the GPI method is presented. The fourth section outlines the results, which includes aggregate, per capita, and component analysis, and comparisons between the COVID-19 pandemic and the impacts of other macroeconomic shocks in the study period. The fifth section discusses the main outcomes and government efforts to mitigate costs during the pandemic, as well as providing broader methodological reflections. In the sixth section, the conclusion states key outcomes and some areas for further research.

Overview of the Impacts of COVID-19 in Iceland

HISTORY OF THE COVID-19 PANDEMIC IN ICELAND

The first COVID-19 infection was diagnosed in Iceland on 28th February 2020. By 27th September 2022, the total number of cases was 205,454, of whom 213 had died (Worldometer n.d.). Proportionally, 54.6% of all inhabitants had been infected at least once by the virus (Cook and Jóhannsdóttir 2021). Iceland's aggregate case numbers were very low in

a global context; however, the infection rate per 100,000 inhabitants was at times among the highest in the world, with large spikes in infections occurring in March 2020, September and October 2020, December 2021 and January 2022. Cook and Jóhannsdóttir (2021) described the use of a mixture of soft and hard measures to contain the pandemic in Iceland, which varied according to the extent of specific outbreaks. These included limitations on the types and size of gatherings (as low as groups of 10 people), with the intermittent closure of public venues such as swimming pools, cinemas, schools, businesses in the tourism sector and entertainment venues. In addition, there was frequently a widespread mandatory requirement for physical distancing, the wearing of masks and use of hand sanitiser in buildings accessed by the public.

The Icelandic Government initiated home-based quarantine, with very high levels of polymerase chain reaction (PCR) testing. In the period between 20th March 2020 and 1st July 2020, all foreign nationals, except those from the EU, EEA, EFTA, and UK, were not allowed to enter Iceland, although there were some special exemptions, and generally a 14-day period of quarantine was required for all. This approach started to evolve in December 2020 when Iceland began to accept certificates of previous infection at the border, positive PCR tests and international vaccination certificates. Thereafter, up until 25th February 2022, when all domestic and border restrictions were lifted, there was strict double testing at the border of returning visitors, initially with the inclusion of a minimum five-day period of quarantine in between tests, which was then adapted to a one-day quarantine if visitors had an approved certificate of vaccination (Cook and Jóhannsdóttir 2021). The adopted measures, in tandem with a rapid vaccination programme (90% of the population were vaccinated by November 2021), were mostly successful, with Iceland often the only European nation with a 'green' status in the weekly infection reports of the European Centre for Disease Prevention (2022).

ECONOMIC CONSEQUENCES AND GOVERNMENT RESPONSE IN ICELAND

The economic impacts of the pandemic on Iceland were considerable, especially in the six to nine months prior to the initiation of a vaccination programme. In the first nine months of 2020, the Government of Iceland (2020) estimated that gross factor income linked to tourism, the nation's most significant export industry, was reduced by around 60% compared to the same period in 2019. Unemployment levels in Iceland

reached their highest levels since 2012, with a national average of 12% reported in June 2020. However, there was considerable regional variability. In Suðurnes, an unemployment rate as high as 26% was reported in January 2021 (Statistics Iceland 2021). Much of the unemployment across Iceland related to lost jobs in the tourism industry and related hospitalities (Cook and Jóhannsdóttir 2021).

The combination of border and domestic restrictions led to a reduction in international visitors from just over 2 million in 2019 to just under 500,000 in 2020, a precipitous 76% fall. This increased by 44% to nearly 700,000 in 2021, which was still 65% below the 2019 total, but after all restrictions on international entrants were lifted early in 2022, visitor numbers increased to 1.7 and 2.2 million in 2022 and 2023, respectively (Icelandic Tourist Board n.d.). The cruise ship industry also suffered in the first year of the pandemic, with the number of visitors reducing from 549,000 in 2019 to 2,300 in 2020, a 99.6% decline (Icelandic Tourist Board n.d.). Other major economic effects in Iceland included supply chain disruptions, especially in fisheries. This led to significant reductions in the profits of some companies – for example, Iceland Seafood International reported sales in the first six months of 2020 of 183.2 million Euros, a reduction of 21% compared to the corresponding period in 2019 (Holland 2020).

The Icelandic Government rapidly put forth various economic packages to support the fiscal balance and general economic and societal stability and resilience during the COVID-19 pandemic. These related predominantly to benefits and wage financing; subsidies, grants and funds; and targeted marketing and support measures for the recovery (Cook and Jóhannsdóttir 2021). Regarding benefits and wage financing, these included temporary increases in unemployment benefits, partial compensation schemes for partial unemployment, child benefit supplements, payment of wage costs during notice periods, payment of wages during quarantine, and repayment of Value Added Tax for home improvement works and domestic construction activities. In terms of subsidies, grants, and funds, the main elements encompassed income loss subsidies for the self-employed, resilience subsidies for companies suffering at least 40% reductions in revenues, closure subsidies, and hiring grants. Targeted marketing and support measures included front-loading of investment, international marketing campaigns to promote future tourism, and Travel Gift vouchers to promote domestic tourism during the pandemic (Cook and Jóhannsdóttir 2021).

Methodology

THEORETICAL UNDERPINNINGS OF THE GPI

Over the years, there have been various perspectives set out on the theoretical underpinnings of the GPI, which have contributed to sometimes diverse methodological approaches and selection of sub-indicators. We do not seek to offer a comprehensive review of them all, which has been provided in recent publications such as Malinauskaite et al. (2026), but rather to emphasise that in seeking greater methodological standardisation, Talberth and Weisdorf (2017) affirmed four distinguishing methodological principles that should be adopted in any GPI study: (1) emphasis on final consumption of market and non-market goods and services by a given population in a specific period of time; (2) focus on quantifying current economic welfare generated by consumption; (3) inclusion of only costs and benefits that are demonstrably linked to economic activities; and (4) monetisation of costs and benefits to be applied using best available data and peer reviewed methods. These reasonings provide the basis for the GPI method adopted in this study.

CALCULATION OF THE ICELANDIC GPI

The pilot Icelandic GPI study by Cook and Davíðsdóttir (2021) adhered to the GPI 2.0 method piloted by Talberth and Weisdorf (2017) in terms of its functional form, as represented by equation (1), and the same framework is applied in this version. For a specific period (each year) and population (Iceland's), equation (1) aggregates utility from the consumption of goods and services to utility sourced from various capital assets, then deducts disutility from undesirable environmental and social conditions.

Equation (1):

$$GPI_t = \frac{1}{N} \left[U_i((HBE_i - DEFR - HI_i) \times INQ + PP)_i \right. \\ \left. + U_i(s(KH_i + KS_i + KB_i)) \right. \\ \left. - dU_i(DKN_i + POL_i + SC_i) \right], \quad (1)$$

where:

- U is utility
- DU is disutility
- HBE are household budget expenditures
- $DEFR$ are defensive and regrettable expenditures

- HI are household investments
- INQ is an income inequality adjustment
- PP are public provision of goods and services
- s is services
- KH are services from human capital
- KS are services from social capital
- KB are services from built capital
- DKN is depletion of natural capital
- POL is pollution
- SC are social costs of economic activity

Based on the lessons learned from the Icelandic GPI pilot study of Cook and Davíðsdóttir (2021) and the critique of the GPI 2.0 method provided by Malinauskaite et al.'s (2026) systematic literature review, this study's method omitted variables of negligible scale, including costs of overharvesting fisheries, avoided environmental depletion costs by government, and government expenditures on recreation, culture, and religion; those potentially likely to lead to double counting, such as ozone depletion costs duplicating the climate change contribution costs; or those associated with considerable uncertainty. Regarding the latter, the estimated aggregate value for Iceland's ecosystem services, which constituted 108% of the value of Iceland's GDP in 2019 (Cook and Davíðsdóttir 2021), has been left out of this study. This was because it was based on a single, somewhat crude order of magnitude approximation by benefit transfer (Cook and Davíðsdóttir 2022), had a distortionary impact on the overall results, and because scarcely any primary non-market valuation studies are available in an Icelandic context from which to form a reliable alternative estimate.

Table A1 in the Appendix provides a detailed summary of the GPI methodology adopted in this study, outlining the calculation methods which were used for each sub-indicator and related data sources. A total of 28 sub-indicators were included, specific to the three main categories and sub-categories of economic welfare expressed by equation (1). All costs and benefit components were adjusted for inflation and reflected constant 2023 prices in the currency of Icelandic króna. Some values for the 2023 year were not yet available, such as for the Gini coefficient. As these calculation inputs had demonstrated very little variability in recent years, they were assumed to be unchanged from their 2022 values.

Results

OVERALL TRENDS FROM 2000 TO 2023

Figures 1 and 2 provide a comparison of Iceland's GDP and GPI over the period 2000 to 2023 with respect to aggregate and per capita values. All values are stated in constant Icelandic prices (2023) in either trillion or million ISK (T or M ISK), with commensurate values in million euros provided in brackets afterwards. These were based on the average exchange rate throughout 2023 of 1 ISK to 0.006706 Euros.

During the years 2004 to 2007 and 2012 to 2020, Iceland's GPI exceeded GDP (albeit narrowly in 2015), lagging behind only during the period 2000 to 2003 and in the aftermath of the banking-induced crisis of 2008. Unlike the five years required for Iceland's GPI, its GDP aggregation only took eight years to recover to its former zenith of 2008. In the period of the COVID-19 pandemic, only Iceland's GDP contracted, and the degree of divergence between GDP and the GPI remained consistent, with the same trend evident in the per capita data.

Starting at 2.04 T ISK (13,685 M€) in 2000, GDP grew steadily. Early growth was robust, peaking at 3.16 T ISK (21,187 M€) in 2008 (a 54.8% increase from 2000), driven by a booming financial sector and increased construction activity (Duhs 2021; OECD 2021). However, the 2008 financial crisis triggered a sharp decline, with GDP falling to 2.87 T ISK (19,251 M€) in 2009 – a 9.1% drop – reflecting Iceland's banking collapse and

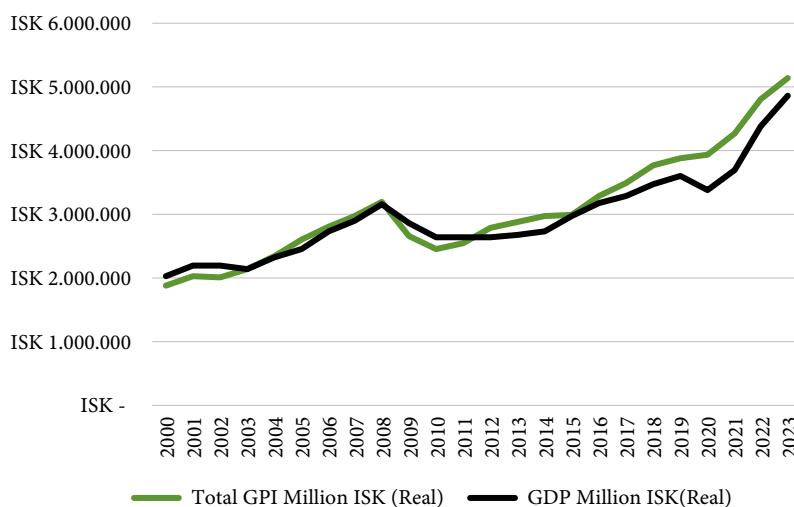


FIGURE 1 Icelandic GDP Versus GPI, 2000–2023 (M ISK, 2023 prices)

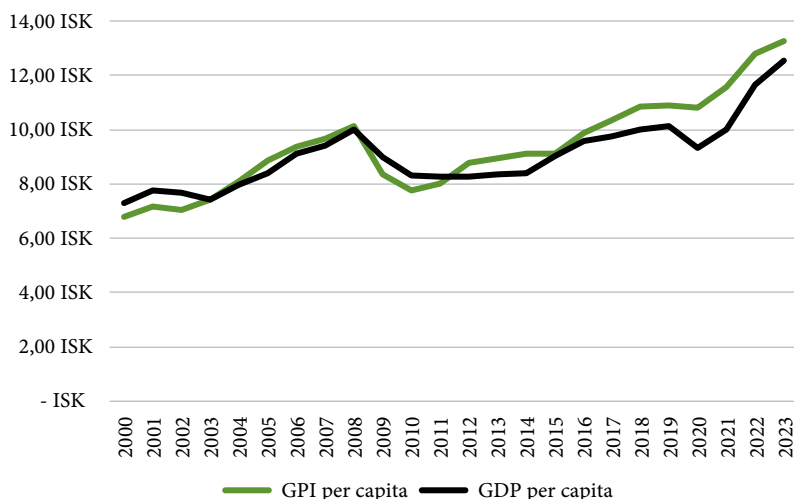


FIGURE 2 Icelandic GDP Versus GPI, 2000–2023 (M ISK per capita, 2023 prices)

currency depreciation (Bryant and Sigurjónsson 2022). Post-crisis recovery began in 2010, with GDP stabilising at 2.64 T ISK (17,734 M€) and then accelerating, particularly after 2015, fuelled by increased tourism and export growth (Duhs 2021). By 2023, GDP reached 4.86 T ISK (32,610 M€), a 138% increase from 2000 and a compound annual growth rate (CAGR) of 3.8% over the full period. Despite the blip in 2020 linked to the COVID-19 pandemic, the most significant growth occurred post-2015, with an average annual increase of 6.6% from 2015 (2.97 T ISK; 19,949 M€) to 2023, much of which was linked to Iceland's post-2012 tourism expansion (Bryant and Sigurjónsson 2022).

The GPI also rose over the entire assessment period but with distinct differences in pace and volatility. Starting at 1.89 T ISK (12,659 M€) in 2000, the GPI grew to 3.2 T ISK (21,410 M€) by 2007, surpassing GDP's growth rate in this phase. In contrast to GDP, the GPI's post financial crisis dip was more severe, falling to 2.67 T ISK (17,884 M€) in 2009 (a 16.5% decline). From 2010, the GPI recovered steadily, hitting 3.89 T ISK (26,053 M€) in 2019, a 105.8% increase from 2000, before increasing only slightly (1.2%) to 3.93 T ISK (26,368 M€) in 2020 due to the pandemic's impact on tourism and social costs. By 2023, the GPI reached 5.14 T ISK (34,494 M€), a 172.5% rise from 2000 and a CAGR of 4.4%.

While both the GDP and GPI trend is upward, GPI consistently exceeded GDP in real terms from 2015 onward, reflecting its inclusion of positive non-market contributions (e.g. services from social and built capital) and

adjustments for negative externalities (e.g. pollution and greenhouse gas emissions). In 2000, the GPI was 92.5% of GDP, but by 2023, it was 105.8%, peaking at 114.8% in 2020. This divergence highlights that Iceland's economic growth increasingly translated into broader societal benefits in the period after the 2008 financial crisis, though not uniformly. Key inflection points reveal distinct patterns. Pre-2008, GDP outpaced the GPI (e.g. 2006: GDP of 2.73 T ISK vs. GPI of 2.82 T ISK; 18,320 vs. 18,878 M€), reflecting growth driven in part by financial speculation (Bryant and Sigurjónsson 2022), with rising environmental (e.g. greenhouse gas emissions) and social costs (e.g. costs of commuting). Post-2008, the GPI's recovery was stronger, driven by factors such as reduced inequality (the indexed Gini-based income distribution improved from 120.26 in 2008 to 107.0 in 2023) and increased leisure time (adjusted mean individual leisure time rose from 1,699 hours in 2008 to 1,789 hours in 2023).

Demonstrating similar patterns to the aggregate data, GDP per capita grew from 7.31 M ISK (0.05 M€) in 2000 to 12.54 M ISK (0.08 M€) in 2023 (a 71.6% increase), while GPI per capita rose from 6.76 (0.05 M€) to 13.27 M ISK (0.09 M€), a 96.2% increase. This gap again underscores the GPI's emphasis on broader welfare gains outstripping raw macroeconomic output per person, particularly as the Icelandic population grew in this period from 279,049 to 387,758.

GDP AND THE GPI DURING THE COVID-19 YEARS: 2019 TO 2023

In 2019, Iceland's GDP stood at 3.61 T ISK (24,206 M€), reflecting a strong pre-pandemic economy driven by tourism and fisheries (Duhs 2021). The onset of COVID-19 in 2020 led to a sharp decline, with GDP dropping to 3.39 T ISK (22,749 M€) – a 6.0% reduction. This contraction was largely due to the collapse of tourism, a key economic driver, as international travel restrictions prevented visitors (Central Bank of Iceland 2021). Household consumption also stabilised (1.81 T ISK in 2019 vs. 1.82 T ISK in 2020; 12,145 vs. 12,174 M€), unlike in the years 2021 to 2023, when growth was evident.

Macroeconomic recovery began in 2021, with GDP rising to 3.69 T ISK (24,750 M€), an 8.8% increase from 2020), fuelled by domestic stimulus, a partial tourism rebound, and strong exports (especially of fresh and frozen fish), which were 21.8% higher in economic value than in 2020 (Statistics Iceland 2022). By 2022, as travel restrictions eased and global demand strengthened, Icelandic GDP increased to 4.38 T ISK (29,373 M€),

a growth of 18.7% from 2021. As tourist numbers in Iceland rebounded to pre-pandemic highs, this momentum continued into 2023, with GDP growing by 11.0% to reach 4.86 T ISK (32,611 M€). This constituted a 34.7% increase from 2019 and a CAGR of 7.7%. Per capita GDP rose from 10.11 M ISK (0.07 M€) in 2019 to 12.54 M ISK (0.08 M ISK) in 2023 (24.0% growth), despite population growth from 356,991 to 387,758 inhabitants.

The GPI started at 3.88 T ISK (26,040 M€) in 2019, rising slightly to 3.93 T ISK (26,368 M€), a 1.3% increase, in 2021, in stark contrast to GDP's decline. This resilience stemmed from gains in non-market factors: services from social capital increased (1.88 to 1.91 T ISK; 12,583 to 12,783 M€), leisure time grew (adjusted mean individual leisure time rose from 1,735 to 1,789 hours as work hours dropped from 39.6 to 38 per week), and environmental costs fell. However, social costs spiked, especially unemployment (0.08 T ISK in 2019 vs. 0.14 T ISK in 2020; 545 vs. 911 M€), constraining gains.

In 2021, the GPI increased to 4.27 T ISK (28,656 M€) (8.7% growth), aligning with GDP's recovery, which was driven in part by the reduction in the Central Bank's main interest rate to a record low of 0.75% at the end of 2020 (Central Bank of Iceland 2020), and expanded public services (e.g. healthcare expenditure increased from 0.31 to 0.34 T ISK; 2,075 to 2,249 M€). By 2022, GPI reached 4.81 T ISK (32,288 M€), 12.7% growth on 2021, surpassing GDP growth as leisure time benefits persisted and environmental costs remained stable. In 2023, the GPI reached 5.14 T ISK (34,494 M€), which was 6.8% growth on 2022, a 32.5% increase from 2019, and a CAGR of 7.3% over the period 2019–2023. GPI per capita grew from 10.88 M ISK (0.07 M€) in 2019 to 13.27 M ISK (0.09 M€) in 2023 (22.0% expansion), slightly lagging GDP per capita growth.

The pandemic exposed a brief divergence between GDP and the GPI. In 2020, GDP fell by 6.0% while the GPI rose by 1.3%, reflecting its sensitivity to predominantly economic (e.g. increased public expenditures on healthcare and education), but also non-economic, gains (e.g. reduced environmental damages, such as non-renewable resource depletion, and increased leisure time, despite economic contraction). The GPI's 2020 peak relative to GDP (115.9% of GDP vs. 107.6% in 2019) underscores this disconnection. Post-2020, both metrics recovered strongly, but the GPI's growth was steadier (an average annual increase of 9.2% from 2020–2023 vs. GDP's 12.8%), driven by sustained social and environmental adjustments. Key drivers of the GPI's resilience included a pronounced drop in costs relating to natural capital depletion (e.g. oil

use fell from 43.3 PJ in 2019 to 24.6 PJ in 2020, albeit it has rebounded from 2022 onwards) and reduced overemployment costs (from 0.08 T ISK [545 M€] in 2019 to zero in 2020 as average work hours fell). Meanwhile, GDP's swift recovery reflected the tourism sector's swift rebound (e.g. household consumption rose from 1.82 T ISK (12,174 M€) in 2020 to 2.56 T ISK (17,157 M€) in 2023) and export income strength (e.g. the economic value of exports was 31.4% higher in 2022 than 2021 (Statistics Iceland 2023)).

GPI CATEGORY ANALYSIS FROM 2019–2023

Table 1 displays an analysis of changes in the three main aggregate category values of the Icelandic GPI from 2019 to 2023, with a more detailed sub-component breakdown provided in Table A.2 in the Appendix.

As evidenced in table 1, utility from goods and services was 2.43 T ISK in 2019, driven by robust consumption and public spending. In 2020, utility from goods and services fell slightly by 0.2% to 2.42 T ISK (16,241 M€), but otherwise it grew each year. Consumption held fairly steady initially (a 2.19% drop in 2020), but public healthcare spending grew from 0.31 to 0.34 T ISK (2,075 to 2,249 M€) from 2020 to 2021 and expenditure on education increased by 14.3% between 2019 and 2020, helping to more than offset increased defensive and regrettable expenditures in 2020. As the pandemic's social and economic restrictions started to wane, unadjusted consumption in 2023 was 41.0% higher in 2023 than in 2019, with only a negligible change to income inequality. Overall, the 33.6% rise in

TABLE 1 GPI Category Analysis, 2019–2023 (values in 2023 prices)

Category		2019	2020	2021	2022	2023
Utility from consumption of goods and services	M ISK	2,426,725	2,421,840	2,664,229	3,016,713	3,241,815
	% change yearly		(0.20)	10.01	13.23	7.46
Utility from capital assets	M ISK	1,954,506	1,996,805	2,098,363	2,252,578	2,357,289
	% change yearly		2.16	5.09	7.35	4.65
Disutility from undesirable environmental and social conditions	M ISK	(498,134)	(486,661)	(489,431)	(454,475)	(455,316)
	% change yearly		2.30	(0.57)	7.14	(0.19)
Total	M ISK	3,883,097	3,931,984	4,273,161	4,814,816	5,143,788
	% change yearly		1.26	8.68	12.68	6.83
Euro equivalent (millions)		26,040	26,368	28,656	32,288	34,494

utility from goods and services over 2019–2023 mirrors GDP's recovery (34.7%), highlighting its role as both a core GDP and GPI element.

Services from capital assets (human, social, and built capital) capture non-market contributions to well-being. In 2019, these totalled 1.95 T ISK (13,107 M€), with social capital (1.87 T ISK; 12,543 M€) dominant, reflecting the estimated economic benefits of volunteer work and leisure time. In 2020, this rose by 2.2% to 2.00 T ISK (13,391 M€), as social capital increased to 1.91 T ISK (12,783 M€) due to leisure gains (1,789 hours) from reduced work hours (39.6 to 38 weekly). Built capital (13,018 M ISK; 87 M€) and human capital contributions, although insignificant contributors to the category total, also grew modestly. In 2021, this component jumped 5.2% to 2.10 T ISK (14,072 M€), with social capital at 2.00 T ISK (13,407 M€). In 2022, this reached 2.25 T ISK (15,106 M€) (7.4% growth), and by 2023, it hit 2.36 T ISK (15,808 M€) (4.6% growth), a 20.6% increase compared to 2019. Social capital (2.26 T ISK; 15,129 M€) remained the backbone, bolstered by increased leisure time benefits of 20.8% from 2019 to 2023.

Aggregate environmental and social cost deductions for natural capital depletion, pollution, unemployment, crime, commuting, and accidents fell from 0.50 T ISK (3,340 M€) in 2019 to 0.46 T ISK (3,053 M€) in 2023, an 8.6% decrease. At the outset of the pandemic in 2020, combined environmental and social costs dropped 2.3% overall to 0.47 T ISK (3,264 M€), as environmental costs fell, with fossil fuel consumption falling from 43.3 to 24.6 PJ. However, within this combined category, unemployment costs still soared (0.14 T ISK vs. 0.81 T ISK; 911 vs. 545 M€) due to pandemic layoffs. In 2021, environmental and social costs rebounded by 0.6% to 0.49 T ISK (3,282 M€). By 2022, environmental and social costs fell again to 0.45 T ISK (3,048 M€), largely due to a 34.4% drop in the numbers listed as unemployed.

Discussion

CONTEXTUALISATION OF OUTCOMES AND GOVERNMENT EFFORTS TO MITIGATE ECONOMIC DAMAGES

As far as the authors are aware, the only national GPI study broadly comparable to this one is the examination of the Australian GPI in the first six months of 2020 by Karatopouzis et al. (2022). However, those outcomes cannot be directly compared since this study accords with the more comprehensive, capital asset-based GPI 2.0 method advocated by Talberth and Weisdorf (2017) and Cook and Davíðsdóttir (2021). Karatopouzis et al. (2022) also utilised fewer sub-indicators – 20 as opposed

to the 28 selected in this study. However, despite the focus on only two economic quarters rather than the entirety of the COVID-19 pandemic and the variables omitted by Karatopouzis et al. (2022), such as the economic value of economic services and public provision of goods and services, which have considerable aggregate value in the Icelandic GPI, some commonalities can be observed in the outcomes of the respective studies specific to the sub-indicators that are aligned and which rely on similar calculation methods. The study outcomes affirm similar overall findings, namely that the pandemic restricted the capacity of individuals to earn and consume, and that related social and economic costs exceeded any environmental benefits.

The health policy responses of the Icelandic government, prioritised the need to protect public health, and therefore restrictions on gathering limits and opening hours occurred with a swiftness that had negative economic connotations for employment and consumption, albeit, in the case of the latter, not to the same degree as had been evident during Iceland's financial crash of 2008. The Icelandic financial collapse of 2008 was associated with widespread business bankruptcies and unemployment was particularly linked to finance and related sectors, and there was a sudden halt in foreign investment and credit. In contrast, the COVID-19 pandemic, starting in 2020, hit Iceland's economy through a different mechanism: a collapse in tourism, which had become the country's largest export sector by then, accounting for over 40% of exports pre-pandemic (Duhs 2021; OECD 2021). The Icelandic government were able to mitigate this to some extent through both fiscal and monetary policy measures, including payments of a significant share of wages (Grout et al. 2023), incentives to encourage domestic tourism, and a reduction in the Central Bank's main interest rate to a record low of 0.75% in November 2020 (Central Bank of Iceland 2020). These approaches helped to sustain domestic consumption, which increased in real terms by 0.2% in 2020 compared to 2019.

The 0.2% growth in consumption in Iceland between 2019 and 2020 was markedly different to the outcome in the Australian GPI. This was particularly evident in Q2 of 2020 when the effects of the pandemic were felt more strongly than in Q1. Consumption declined by 34 billion AUS \$, equal to 12.8%. Similarly to the Icelandic case, increased costs of unemployment in the Australian GPI of 23.4% more than offset the fall in environmental costs (Karatopouzis et al. 2022). In 2020, environmental costs declined by 5.5% in the case of Iceland and 3.1% in Q2 of the Australian

GPI. The greater percentage reduction in Iceland was driven by a 4.3% reduction in the costs of climate change and the 76.0% diminishment in non-renewable resource consumption in 2020 compared to 2019. For other comparable sub-indicators, the Australian GPI also provided evidence of reduced costs of crime and family changes. Although likely driven by different methodological approaches by Karatopouzis et al. (2022), such as adopting a net revenue rather than social payoff approach for valuing the benefits of higher education, the value of higher education reduced by 12.8% in Q2 of the Australian GPI, unlike in Iceland's case, where it increased by 3.3%.

The OECD (2022) had reported in June 2022 that a resurgent tourism sector, reduced unemployment and increased flows of foreign currency were likely to lead to growth in Icelandic GDP of 4.2% in 2022 and 2.8% in 2023. In the end, GDP growth of 18.7% and 11.0% was delivered in 2022 and 2023, respectively. Many of the support payments made by the Icelandic government in 2020 and 2021, especially income loss and resilience subsidies, and targeted marketing campaigns, may have played a role in this recovery. Initially, there was a strong focus on promoting domestic tourism during the pandemic, as international arrivals in 2020 fell by 76% (Grout et al. 2023; Icelandic Tourist Board n.d.). This included advertising campaigns and small economic inducements, including a Travel Gift Voucher worth 5,000 ISK, which could be used as a form of payment in most Icelandic tourism companies, and was issued in both 2020 and 2021 (Grout et al. 2023). In tandem with the lowering of interest rates and various measures taken to provide financial support to business and the unemployed, such initiatives likely helped to ensure that Icelandic consumption did not fall during the pandemic, minimising the scale of the one-year recession in GDP, and ensuring that the GPI did not reduce at all from 2019 to 2023. Other efforts made by the Icelandic government to ensure economic stability and a swift post-pandemic rebound included allowing individuals to claim unemployment benefits at the same time as undertaking educational training. These were reflected as increased social costs in the GPI in 2020 and 2021, but they could partially be conceived of as investments. Furthermore, aided and abetted by the first volcanic eruption in the vicinity of Reykjavík for around 800 years in 2021 (Barsotti et al. 2023), a successful international marketing campaign, carried out as a collaboration between the Icelandic Government and the Icelandic Agency for Promotion and Marketing Offshore, helped to encourage foreign tourists to return to Iceland rapidly once the

pandemic's restrictions were fully lifted in 2022 (Grout et al. 2023). This proved to be effective, with tourist numbers in 2023 already exceeding the level observed in 2019, almost matching the 2018 peak and exceeding it in terms of nights stayed (Icelandic Tourist Board n.d.).

Other key economic endeavours by the Icelandic government included the increased investment in healthcare and infrastructure – in the case of the former, by allocating additional funds to public healthcare to deal with the emergency medical situation; for the latter, by front-loading public investment, especially related to transportation, tourism, and technology infrastructure. This leads to the observation that although the GPI, as conceived by Talberth and Weisdorf (2017) and reflected in their GPI 2.0 method, is intended to be a measure of current economic welfare, during a crisis event such as the COVID-19 pandemic, to some extent it also reflects economic resilience to shocks, since considerable shares of the government's public expenditure on healthcare and education were defensive endeavours undertaken to minimise damages, rather than realise any welfare benefits e.g. reducing pandemic death rates through purchases of personal protective equipment and diminishing rates of educational dropouts by paying unemployment benefits alongside university study (Hall et al. 2022; Hultkrantz and Svensson 2022).

The Icelandic approach to maintaining economic resilience, as reported by Cook and Jóhannsdóttir (2021), had some similarities to the island case of Greenland, whereby government expenditure on health was increased to minimise the potential for systemic risk events, and investment was viewed as the bedrock of economic resilience and recovery. The focus of both Iceland and Greenland on tourism was interesting in the light of the OECD's (2021) assertion that Iceland's economy had become too dependent on tourism and required further diversification. This may be correct, and the COVID-19 pandemic highlighted specific vulnerabilities and dependencies, but it perhaps does not recognise that tourism had already proven to be an effective means for Iceland of diversifying and recovering in the aftermath of a far deeper economic crisis – the banking and financial collapse of 2008 (Mixa and Loftsdóttir 2021). Moreover, further short-term diversification of island economies with small populations in often inhospitable climates, such as Greenland and the Faroes, is challenging, certainly in the short to medium term (Armstrong and Read 2021). Thus, in the case of Iceland, economic resilience and recovery was not about sectoral diversification, but rather the enhancement of existing strengths and 'being ready' in terms of infrastruc-

ture provision for the post-pandemic economic rebound, an approach that has also been evident in Southeast Asia (Deloitte and Infrastructure Asia 2020), Iran (Hajilo et al. 2024), and Botswana (Kenalemang and Stephens 2025).

BROADER REFLECTIONS ON DEGROWTH, THE THRESHOLD HYPOTHESIS, AND POLICY IMPLICATIONS

Given the contraction in Icelandic GDP and reduction in environmental costs in the GPI over the period 2019–2020, and perhaps by accident rather than government intention, the effects of the COVID-19 pandemic may have exemplified several of the features often advocated within the degrowth (Kallis 2011) or ‘agrowth’ movements (van den Bergh 2022), as well as the doughnut economy framework of Raworth (2017) whereby economic activities do not contribute to the exceedance of planetary boundaries and minimum social needs are fulfilled. For the purposes of this study, the GPI was a particularly useful metric for evaluating many of the broader macroeconomic and socio-economic implications of the COVID-19 pandemic, many aspects of which have parallels to policy interventions advocated in degrowth economics. These include approaches such as universal basic income, strict limits to greenhouse gas emissions, embracing flexible and part-time working, and creation of public money (Kallis 2011; Kallis et al. 2025; Karatopouzis et al. 2022). Constrained consumption, especially of non-renewable resources, was evident and induced by a combination of measures, especially gathering and travel restrictions and limits on the opening of economically important activities (Cook and Jóhannsdóttir 2021).

Although not universally applied and with some conditions, the range of Icelandic government support payments for the unemployed and business support packages were akin to a trial of universal basic income, especially when wages were paid by the state during notice periods and quarantine. Despite this, the use of the GPI should still be regarded with some caution for those envisioning transitions to post-growth futures. The devil is in the details of the GPI, rather than its headline outcomes. As was evident in Iceland’s GPI in 2023, growth in utility from consumption of goods and services can outpace slightly increased environmental and social costs, leading to an overall increase in the value of the GPI, all other factors being equal. Overemphasis on the GPI’s aggregate outcomes could, therefore, promote weak sustainability (Hoekstra 2019) and prolong a growth-focused narrative, potentially beyond the point at

which critical ecological thresholds will have been breached (Neumayer 2000). Furthermore, the GPI places a narrow lens on costs and benefits occurring in a particular place and at a specific point in time. It does not account for costs that are shifted abroad, such as carbon intensive production methods (Van der Slycken and Bleys 2020), or unaccounted for, such as greenhouse gas emissions linked to international aviation.

Several GPI policy implications were identified in the recent systematic literature review by Malinauskaite et al. (2026). These included raising awareness about the economic and social trade-offs of different macroeconomic policies and highlighting both the positive and negative welfare impacts of economic activity, including non-market components. For the most part during the assessment period, and entirely after the year 2017, the Icelandic GPI remained above GDP, with no convergence. This outcome sits in contrast to much of the GPI literature, which reports threshold effects due to economic and social trade-offs. First described by Max-Neef (1995) and supported by considerable empirical evidence (Kubiszewski et al. 2013; Long and Ji 2019; Van der Slycken and Bleys 2020), the threshold hypothesis contends that after a certain degree of GDP growth, economic activities become uneconomic, with the environmental and social costs of macroeconomic expansion exceeding the benefits. Others have suggested that Max-Neef's (1995) threshold hypothesis is caused by methodological flaws in the GPI rather than welfare effects (Dietz and Neumayer 2006). The efforts of Talberth and Weisdorf (2017) to try and establish greater standardisation in the GPI's methodology through the GPI 2.0 method, especially for the purposes of establishing greater theoretical rigour and to enable easier comparison between the outcomes of national studies, have had limited success to date (Malinauskaite et al. 2026). However, in the two national studies to date to adopt the GPI 2.0 method on the US and Iceland (Talberth and Weisdorf 2017; Cook and Davíðsdóttir 2021), which places greater focus than earlier methods on including the monetary value of multiple services from capital assets and current economic welfare (Malinauskaite et al. 2026), neither found any evidence in support of the threshold hypothesis. In both these national studies, as in this case, economic growth was not found to be 'uneconomic' in recent years.

This Icelandic case study also contributes to the wider international 'beyond GDP' policy debate by demonstrating how the GPI can provide a more multidimensional assessment of economic performance during periods of crisis than conventional GDP measures alone. In line with

growing international calls for complementary welfare indicators within sustainable development policy (Costanza et al. 2014; Van der Slycken and Bleys 2020; Malinauskaite et al. 2026), the Icelandic results illustrate how social protection measures, public healthcare investment, leisure time, and environmental externalities materially shaped national welfare outcomes during the COVID-19 pandemic, despite contractions in GDP. The findings therefore reinforce longstanding arguments within the broader post-growth and wellbeing economy literature that macroeconomic resilience cannot be adequately evaluated through production-based indicators alone. Even though the trade-off of increased social costs was perhaps inevitable given surging unemployment during the COVID-19 pandemic, this study's GPI results imply that macroeconomic welfare need not decline overall, especially if priority is given by policy-makers to targeted expenditures on education and healthcare and investing in domestic industries. As Martinez et al. (2021) contend, this approach, adopted by many national governments during the COVID-19 pandemic, could be conceived of as a classic Keynesian injection via increased government spending, as a means of resolving unemployment and boosting aggregate demand.

METHODOLOGICAL REFLECTIONS AND STUDY LIMITATIONS

Several methodological challenges and pitfalls in this study's GPI method were evident, some of which were of specific importance to assessing the macroeconomic impacts of a crisis event such as a pandemic through the GPI. The first, more general observation, concerns the typical emphasis in GPI studies of comparing growth rates with those of GDP. Given that the GPI 2.0 method includes several additional benefits that are commonly excluded from GPI 1.0 studies, and in some cases exceed the value of GDP, comparing the percentage growth rate of GPI with GDP always constitutes a somewhat misleading analysis given the different scales of the aggregations. Another issue concerns the availability of timely data. Hoekstra (2019), Cook and Davíðsdóttir (2021) and van den Bergh (2022), among others, have highlighted this as one of the main reasons why alternative measures of economic welfare have not become institutionalised, at least nowhere near to the same extent as the United Nation's System of National Accounts used for calculating GDP. In this study, some data omissions were evident in 2023, and these may have had an impact on the GPI outcome. In particular, the lack of a Gini coefficient calculation of income inequality in Iceland since 2022 may have

had an influence on outcomes when adjusting consumption, although the adjustment was less than 10% for eleven of the twelve previous years. Time lags and gaps in collating environmental data are common and longstanding, having been reported before in Iceland (Saviolidis et al. 2021).

A further limitation of the consolidated GPI 2.0 method adopted in this study concerns the focus on current economic welfare in a particular period, which, although called for by Talberth and Weisdorf (2017) study, can lead to mixed messages about the extent to which the GPI should capture information about the sustainability of economic activity. An increased debt burden likely imperils the level of future consumption and utility sourced from goods and services in the GPI. Such macroeconomic implications and dynamics have largely been ignored in the recent GPI literature, despite Kenny et al. (2019) calling for further such analysis. Other economic problems in Iceland, not captured by the GPI, have related to the historically low interest rates applied by the Central Bank of Iceland in 2020, which contributed to high price inflation in subsequent years (Harðarson 2024). A further limitation of a national GPI study such as this, especially when examining crisis consequences, concerns the lack of any exploration of regional and demographic variations in outcome. As reported by Statistics Iceland (2021), the unemployment rate in the Suðurnes region of Iceland in 2021 was more than double the Icelandic average, with young people working in the service industries hit especially hard, and these nuances are missed. Furthermore, there remains the potential for some double counting in the method, with the social cost of carbon incorporating the costs of deaths from air pollution. Moreover, although increased leisure time was always regarded as a benefit in the calculation, it very likely could have often been a cost, given the increased loneliness, isolation, and mental health challenges experienced by many during the COVID-19 pandemic (Cook and Jóhannsdóttir 2021). In addition, although omitted for reasons of considerable uncertainty and due to the aforementioned scale impacts on the GPI outcomes in the Icelandic pilot study by Cook and Davíðsdóttir (2021), inclusion of the economic value of Iceland's non-market ecosystem services, ideally including dynamic evaluation of changes over time throughout the pandemic, would have provided a more nuanced assessment. If the same estimated aggregate ecosystem services value had been used in this study, as per Cook and Davíðsdóttir (2021), then the Icelandic GPI would have always been two to three times greater than GDP across the assessment

period, but with the consequence that environmental and social costs were dwarfed in comparison.

This study thus also exemplifies several of the methodological criticisms of the GPI 2.0 method distinguished by Malinauskaite et al. (2026) in a recent systematic literature review with a global focus. This found that there seems to be little evidence of any methodological standardisation in recent GPI studies, which greatly constrains the potential for international comparisons. Moreover, many authors still use the earlier 'GPI 1.0' method and are ad hoc in terms of their sub-indicator selections, with these being determined by authors rather than any form of robust stakeholder-focused evaluations. Additionally, the adoption of sensitivity analysis on dominant cost and benefit components is very uncommon. A final factor of importance concerns the possible weightings of the included cost and benefit components in the GPI calculation, with these currently regarded as being of equal importance. Deliberations with stakeholders could also help to identify the degree of influence each has on welfare, ensuring the monetary values for the GPI's sub-indicators are not all equally weighted.

Conclusion

Analysing the trends in GDP and GPI for Iceland from 2000 to 2023 provided insights into economic growth and broader economic well-being and resilience. The assessment period spanned a period marked by economic booms, a severe financial crisis, subsequent recovery, and the challenges of the COVID-19 pandemic, offering a rich context for understanding how traditional macroeconomic output (GDP) either aligns with or diverges from a more holistic measure of progress such as the GPI. From 2000 to 2023, Iceland's GDP and GPI both reflect economic growth, but the GPI's faster rise, especially post-2015, suggests improvements to economic welfare beyond purely aggregate market-based output. The financial crisis of 2008 exposed the vulnerability of Iceland's GDP to speculative bubbles, while the GPI's resilience then and subsequent outperformance of GDP in the period up to 2023 highlighted the value of accounting for the costs and benefits of social and environmental factors to acquire a more multifaceted portrayal. The COVID-19 pandemic period in Iceland starkly illustrated divergent responses between GDP and the GPI. Between 2019 and 2020, GDP fell 6.0% as the tourism sector collapsed. The GPI, however, rose 1.3% over the same period, buoyed by reduced environmental costs, leisure time gains, and

increased public spending on healthcare and education, even as unemployment costs surged, which offset some of the benefits.

The pandemic period and Icelandic case also offer some possible insights into potential post-growth trajectories, albeit they were largely unplanned in Iceland and reactive to an unforeseen crisis. GDP's 2020 decline mirrors constrained consumption in a degrowth scenario, while the GPI's greater resilience aligns with the emphasis placed on post-growth visions of reduced environmental costs, including large-scale reductions in non-renewable resources. Generous welfare support, which was evident in increased public expenditures on healthcare and education, echoes the emphasis of post-growth narratives on social foundations. However, spiralling unemployment costs in the GPI highlight some of the trade-offs, as economic inactivity offset environmental gains.

References

- Armstrong, H. W., and R. Read. 2021. 'The Non-Sovereign Territories: Economic and Environmental Challenges of Sectoral and Geographic Over-Specialisation in Tourism and Financial Services.' *European Urban and Regional Studies* 28 (3): 213–40.
- Bagstad, K. J., G. Berik, and E. J. Brown Gaddis. 2014. 'Methodological Developments in US State-Level Genuine Progress Indicators: Toward GPI 2.0.' *Ecological Indicators* 45:474–85.
- Barsotti, S., M. M. Parks, M. A. Pfeffer, et al. 2023. 'The Eruption in Fagradalsfjall (2021, Iceland): How the Operational Monitoring and the Volcanic Hazard Assessment Contributed to Its Safe Access.' *Natural Hazards* 116:3063–92.
- Bryant, M., and T. O. Sigurjónsson. 2022. 'Iceland's Financial Crisis 2008: Not a Normal Accident.' *Journal of Governance and Regulation* 11 (4): 354–64.
- Butcher, J. 2023. 'Covid-19, Tourism and the Advocacy of Degrowth.' *Tourism Recreation Research* 48 (5): 633–42.
- Central Bank of Iceland. 2020. 'Statement of the Monetary Policy Committee.' *Central Bank of Iceland*, 18 November. <https://cb.is/news-and-publications/article/2020-11-18-Statement-of-the-Monetary-Policy-Committee->.
- Central Bank of Iceland. 2021. 'The Economic Contraction in the Wake of the Pandemic (Box 2).' *Monetary Bulletin* 23 (2). <https://www.cb.is/news-and-publications/article/2021-05-19-Monetary-Bulletin-2021-2>.
- Cook, D., and B. Davíðsdóttir. 2021. 'An Estimate of the Genuine Progress Indicator for Iceland, 2000–2019.' *Ecological Economics* 189:107154.

- Cook, D., and B. Davíðsdóttir. 2022. 'A Preliminary Estimate of the Economic Value of Iceland's Terrestrial Ecosystem Services and Opportunities for Future Research.' *Sustainable Futures* 4:100076.
- Cook, D., and L. Jóhannsdóttir. 2021. 'Impacts, Systemic Risk and National Response Measures Concerning COVID-19 – The Island Case Studies of Iceland and Greenland.' *Sustainability* 13 (15): 8470.
- Coscieme, L., L. F. Mortensen, S. Anderson, J. Ward, I. Donohue, and P. C. Sutton. 2020. 'Going Beyond Gross Domestic Product as an Indicator to Bring Coherence to the Sustainable Development Goals.' *Journal of Cleaner Production* 248:119232.
- Costanza, R., R. De Groot, P. Sutton, et al. 2014. 'Changes in the Global Value of Ecosystem Services.' *Global Environmental Change* 26: 152–8.
- Costanza, R., L. Daly, L. Fioramonti, et al. 2016. 'Modelling and Measuring Sustainable Wellbeing in Connection with the UN Sustainable Development Goals.' *Ecological Economics* 130:350–5.
- Costanza, R., L. Fioramonti, and I. Kubiszewski. 2016. 'The UN Sustainable Development Goals and the Dynamics of Well-Being.' *Frontiers in Ecology and the Environment* 14 (2): 59.
- Coyle, D. 2015. *GDP: A Brief but Affectionate History*. Revised and expanded ed. Princeton University Press.
- Decerf, B., F. H. G. Ferreira, D. G. Mahler, and O. Sterck. 2021. 'Lives and Livelihoods: Estimates of the Global Mortality and Poverty Effects of the Covid-19 Pandemic.' *World Development* 146:105561.
- Delardas, O., K. S. Kechagias, P. N. Pontikos, and P. Giannos. 2022. 'Socio-Economic Impacts and Challenges of the Coronavirus Pandemic (COVID-19): An Updated Review.' *Sustainability* 14 (15): 9699.
- Deloitte and Infrastructure Asia. 2020. *Infrastructure: Leading Southeast Asia's Economic Recovery*. Deloitte and Infrastructure Asia.
- Dietz, S., and E. Neumayer. 2006. 'Some Constructive Criticisms of the Index of Sustainable Economic Welfare.' In *Sustainable Development Indicators in Ecological Economics*, edited by P. Lawn. Edward Elgar.
- Duhs, L. A. 2021. 'Iceland: Evolution of a Small Resource-Based Economy.' *Economic Analysis and Policy* 69:574–84.
- European Centre for Disease Prevention and Control. 2022. 'Data for the Maps in Support of the Council Recommendation on a Coordinated Approach to the Restriction of Free Movement in Response to the COVID-19 Pandemic in the EU/EEA.' 14 July. <https://www.ecdc.europa.eu/en/publications-data/indicators-maps-support-council-recommendation>.
- Fletcher, R., I. Murray Mas, M. Blázquez-Salom, and A. Blanco-Romero. 2020. 'Tourism, Degrowth, and the COVID-19 Crisis.' *POLLEN: Political Ecology Network*, 24 March. <https://politicalecologynetwork.org/2020/03/24/tourism-degrowth-and-the-covid-19-crisis/>.

- Global Petrol Prices. 2024. 'Reykjavik Gasoline Prices, Liter.' https://www.globalpetrolprices.com/Iceland/Reykjavik/gasoline_prices/
- Government of Iceland. 2020. *The Economic Impact of the Pandemic and Containment Measures: 1st Report of the Working Group of the Minister of Finance and Economic Affairs*. Government of Iceland.
- Grout, L., M. Gottfredsson, A. Kvalsvig, M. G. Baker, N. Wilson, and J. Summers. 2023. 'Comparing COVID-19 Pandemic Health Responses in Two High-Income Island Nations: Iceland and New Zealand.' *Scandinavian Journal of Public Health* 51 (5): 797–813.
- Hajilo, M., L. Pennington-Gray, S. Tahmasbi, and S. I. Gheshlagh. 2024. 'Understanding Spatial Tourism Destination Recovery in Iran Based on a Destination Attribute Recovery Index for COVID-19.' *Journal of Contingencies and Crisis Management* 32 (1): e12536.
- Hall, C., I. Hardoy, and M. Lundin. 2022. 'Schooling in the Nordic Countries During the COVID-19 Pandemic.' In *COVID-19 Effect on Economy in the Nordics: Nordic Economics Policy Review 2022*, edited by H. Flam and O. Nordström Skans. Nordic Council of Ministers.
- Halldórsdóttir, Í. H., G. T. Jóhannesson, and A. Walmsley. 2024. 'Entrepreneurial Ecosystem in Crisis: Icelandic Tourism in Times of COVID-19.' In *Tourism Entrepreneurship: Knowledge and Challenges for a Sustainable Future*, edited by D. J. Garcia-Almeira, G. P. Gunnarsdóttir, G. T. Jóhannesson, and T. O. Gudlaugsson. Springer Nature.
- Harðarson, Ó. T. 2024. 'Iceland: Political Developments and Data in 2023: Political and Economic Instability – Government Continues to Lose Support.' *Political Data Yearbook* 63 (1): 218–26.
- Hashem, N. M., A. González-Bulnes, and A. J. Rodriguez-Morales. 2020. 'Animal Welfare and Livestock Supply Chain Sustainability Under the COVID-19 Outbreak: An Overview.' *Frontiers in Veterinary Science* 7:582528.
- Hoekstra, R. 2019. *Replacing GDP by 2030: Towards a Common Language for the Well-Being and Sustainability Community*. Cambridge University Press.
- Holland, J. 2020. 'Reduced First-Half Sales for Iceland Seafood International, but Some Recovery Seen.' *SeafoodSource*, 7 September. <https://www.seafoodsource.com/news/business-finance/reduced-first-half-sales-for-iceland-seafood-international-but-some-covid-recovery-seen>.
- Hong, N. T. H., P. T. M. Huong, and N. Y. Linh, N. 2023. 'The Effects of Weather Variability on the Performance and Risk of Vietnamese Listed Companies: Evidence from the COVID-19 Pandemic.' *International Journal of Sustainable Economy* 15 (4): 415–46.
- Hultkrantz, L., and M. Svensson. 2022. 'The Economic Cost of COVID-19: Iceland, Norway, and Sweden.' In *COVID-19 Effect on Economy in the*

- Nordics: *Nordic Economics Policy Review 2022*, edited by H. Flam and O. Nordström Skans. Nordic Council of Ministers.
- Iceland Chamber of Commerce. 2022. *Icelandic Economy Q3 2022: Current State, Recent Developments and Future Outlook*. Iceland Chamber of Commerce.
- Icelandic Tourist Board. n.d. 'Numbers of Foreign Visitors.' <https://www.ferdamalastofa.is/en/research-and-statistics/numbers-of-foreign-visitors>.
- International Monetary Fund. 2021. *Real GDP Growth – Annual percent stage*. https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOORLD/ISL.
- Inglehart, R., C. Haerpfer, A. Moreno, et al., eds. 2014. *World Values Survey: Round Six – Country-Pooled Datafile*. Data set. JD Systems Institute. <https://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp>.
- ISCED. 2011. 'ISCED Classification Revision 2011.' https://hagstofa.is/media/49855/isced_classification_revision_2011_juni_2010.pdf
- Joo, B. A., and S. I. Mir, S. 2024. 'Insidious Impact of the COVID-19 Pandemic on Leverage of the Tourism and Hospitality Sector in India.' *Managing Global Transitions* 22 (1): 73–93.
- Kallis, G. 2011. 'In Defence of Degrowth.' *Ecological Economics* 70 (5): 873–80.
- Kallis, G., J. Hickel, D. W. O'Neill, et al. 2025. 'Post-Growth: The Science of Wellbeing Within Planetary Boundaries.' *The Lancet Planetary Health* 9 (1): e62–e78.
- Karatopouzis, A., A. A. Voinov, I. Kubiszewski, F. Taghikhah, R. Costanza, and D. Kenny. 2022. 'Estimating the Genuine Progress Indicator Before and During the COVID Pandemic in Australia.' *Ecological Indicators* 141:109025.
- Kenalemang, K., and K. Stephens. 2025. 'An Established Knowledge-Based Economy: The Key Strategy to Facilitating Economic Recovery and Growth Post Covid-19 in Botswana.' *Modern Economy* 16 (3): 325–42.
- Kenny, D. C., R. Costanza, T. Dowsley, et al. 2019. 'Australia's Genuine Progress Indicator Revisited (1962–2013).' *Ecological Economics* 158:1–10.
- Kinnaman, T. C. 2009. 'The Economics of Municipal Solid Waste Management.' *Waste Management* 29 (19): 2615–7.
- Kubiszewski, I., R. Costanza, C. Franco, et al. 2013. 'Beyond GDP: Measuring and Achieving Global Genuine Progress.' *Ecological Economics* 93:57–68.
- Kubiszewski, I., R. Costanza, N. E. Gorko, et al. 2015. 'Estimates of the Genuine Progress Indicator (GPI) for Oregon from 1960–2010 and Recommendations for a Comprehensive Shareholder's Report.' *Ecological Economics* 119:1–7.

- Larsen, J. N., and A. N. Petrov. 2026. 'The Economy of the Arctic.' In *The Palgrave Handbook of Arctic Policy and Politics*, 2nd ed., edited by C. Holroyd, and K. Coates. Palgrave Macmillan.
- Lawn, P. 2013. 'Economic Transition in Australia: Time to Move Towards a Steady-State Economy.' In *Globalisation, Economic Transition and the Environment: Forging a Path to Sustainable Development*, edited by P. Lawn. Edward Elgar.
- Lazarus, E., and C. Brown. 2022. 'Improving the Genuine Progress Indicator to Measure Comparable Net Welfare: US and California, 1995–2017.' *Ecological Economics* 202:107605.
- Loftsdóttir, K. 2018. 'Finding a Place in the World: Political Subjectivities and the Imagination of Iceland After the Economic Crash.' *Focaal: Journal of Global and Historical Anthropology* (80):63–76.
- Long, X., and X. Ji. 2019. 'Economic Growth Quality, Environmental Sustainability, and Social Welfare in China-Provincial Assessment Based on Genuine Progress Indicator (GPI).' *Ecological Economics* 159:157–76.
- Mahler, D. G., N. Yonzan, and C. Lakner. 2022. 'The Impact of COVID-19 on Global Inequality and Poverty.' Policy Research Working Paper no. 10198, World Bank.
- Malinauskaite, L., D. Cook, and B. Davíðsdóttir. 2026. 'The Genuine Progress Indicator's Development and Applications – A Systematic Literature Review from 1995 to 2023.' *Social Indicators Research* 181:38.
- Marino, A., and P. Pariso. 2021. 'The Global Macroeconomic Impacts of COVID-19: Four European scenarios.' *Academy of Strategic Management Journal* 20 (2). <https://www.abacademies.org/articles/the-global-macroeconomic-impacts-of-covid19-four-european-scenarios-10408.html>
- Martin, A., M. Markhvida, S. Hallegatte, and B. Walsh. 2020. 'Socio-Economic Impacts of COVID-19 on Household Consumption and Poverty.' *Economics of Disasters and Climate Change* 4:453–79.
- Martinez, P., W. Huang, and B. Mishra. 2021. 'Coins, Covid, Keynes and K-Shaped Recovery.' In *Cryptography and Data Security: FC 2021 International Workshops*, edited by M. Bernhard, A. Bracciali, L. Gudgeon, T. Haines, A. Klages-Mundt, S. Matsuo, D. Perez, M. Sala, and S. Werner. Springer.
- Max-Neef, M. 1995. 'Economic Growth and Quality of Life: A Threshold Hypothesis.' *Ecological Economics* 15 (2): 115–8.
- Mixa, M. W., and K. Loftsdóttir. 2021. 'Tourism Development and Housing After Iceland's 2008 Crash.' In *International Residential Mobilities: From Lifestyle Migrations to Tourism Gentrification*, edited by J. Dominguez-Mujica, J. McGarrigle, and J. M. Parreño-Castellano. Springer.

- Nechifor, V., M. P. Ramos, E. Ferrari, et al. 2021. 'Food Security and Welfare Changes Under COVID-19 in Sub-Saharan Africa: Impacts and Responses in Kenya.' *Global Food Security* 28:100514.
- 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 (3): 347–61.
- OECD. 2017. *OECD Economic Surveys: Iceland 2017*. OECD Publishing.
- OECD. 2021. 'Iceland: Increase Competition and Economic Diversification to Support the Recovery from COVID-19, Says OECD.' *OECD*, 7 July. <https://www.oecd.org/en/about/news/press-releases/2021/07/iceland-increase-competition-and-economic-diversification-to-support-the-recovery-from-covid-19-says-oecd.html>.
- OECD. 2022. *OECD Economic Outlook, Volume 2022 Issue 1, No. 111*. OECD Publishing.
- O'Mahony, T. 2021. 'Spain's Index of Sustainable Economic Welfare. Are Welfare and Sustainability Compatible?' *Cuadernos económicos de ICE* (101):159–83.
- Peterson, M., G. H. Akearok, K. Cueva, et al. 2023. 'Public Health Restrictions, Directives, and Measures in Arctic Countries in the First Year of the COVID-19 Pandemic.' *International Journal of Circumpolar Health* 82 (1): 2271211.
- Raworth, K. 2017. *Doughnut Economics: Seven Ways to Think like a 21st Century Economist*. Chelsea Green.
- Rennert, K., F. Errickson, B. C. Prest, et al. 2022. 'Comprehensive Evidence Implies a Higher Social Cost of CO₂.' *Nature* 610 (7933): 687–92.
- Samgöngusófa. 2020. *Umferðarslys á Íslandi 2020*. Samgöngustofa.
- Saviolidis, N. M., D. Cook, B. Davíðsdóttir, L. Jóhannsdóttir, and S. Ólafsson. 2021. 'Challenges of National Measurement of Environmental Sustainability in Tourism.' *Current Research in Environmental Sustainability* 3:100079.
- Segal, S., and Gerstel, D. 2020. 'The Global Economic Impacts of COVID-19.' *Center for Strategic & International Studies*, 10 March. <https://www.csis.org/analysis/global-economic-impacts-covid-19>.
- Sigþórsson, H., and V. Hilmarsson. 2014. *Kostnaður umferðarlýsa: Rannsóknarverkefni unnið með styrk frá Vegagerðinni*. Háskólinn í Reykjavík and Vegagerðinni.
- Sigurðardóttir, R. 2020. 'Virus Leaves Iceland's Post-Crisis Tourism Hopes in Tatters.' *Bloomberg*, 4 March. <https://www.bloomberg.com/news/articles/2020-03-05/virus-leaves-iceland-s-post-crisis-tourism-hopes-in-tatters>.
- Statistics Iceland. 2021. 'Seasonally Adjusted Unemployment Rate 8.2% in January.' *Statistic Iceland*, 25 February. <https://statice.is/publications/news-archive/labour-market/the-labour-market-in-january-2021/>

- #::~text=The%20rate%20of%20employed%20individuals,or%203.9%25%20of%20the%20population.
- Statistics Iceland. 2022. 'Trade Deficit of 231.8 billion ISK in 2021.' *Statistic Iceland*, 19 May. <https://statice.is/publications/news-archive/external-trade/trade-in-goods-final-data-for-the-year-2021/>.
- Statistics Iceland. 2023. Trade Deficit of 303 billion ISK in 2022. *Statistic Iceland*, 17 May. <https://statice.is/publications/news-archive/external-trade/trade-in-goods-in-the-year-2022-final-data/#::~text=The%20total%20value%20of%20exports,or%2040.2%25%20of%20total%20exports>.
- Stiglitz, J., J. P. Fitoussi, M., and Durand. 2018. *Beyond GDP: Measuring what Counts for Economic and Social Performance*. OECD Publishing.
- Talberth, J., C. Cobb, and N. Slattery. 2007. *The Genuine Progress Indicator 2006: A Tool for Sustainable Development*. Redefining Progress.
- Talberth, J., and M. Weisdorf. 2017. 'Genuine Progress Indicator 2.0: Pilot Accounts for the US, Maryland, and City of Baltimore 2012–2014.' *Ecological Economics* 142:1–11.
- United Nations. 2015. *Transforming Our World: The 2030 Agenda for Sustainable Development*. A/RES/70/1. United Nations.
- van den Bergh, J. C. J. M. 2022. 'A Procedure for Globally Institutionalizing a 'Beyond-GDP' Metric.' *Ecological Economics* 192:107257.
- Van der Slycken, J., and B. Bleys. 2020. 'A Conceptual Exploration and Critical Inquiry into the Theoretical Foundation(s) of Economic Welfare Measures.' *Ecological Economics* 176:106753.
- World Economic Forum. 2020. *COVID-19 Risks Outlook: A Preliminary Mapping and Its Implications*. World Economic Forum.
- Worldometer. n.d. *Iceland: Coronavirus Cases*. <https://www.worldometers.info/coronavirus/country/iceland/>.

Appendix

TABLE A1 Sub-Indicators Used in the Calculation of Iceland's GPI

Sub-indicator	Summary of calculation method (sources are Statistics Iceland unless stated)	Addition / deduction
Household budget expenditures (HBE) and defensive and regrettable expenditures (DEFER)	Household final consumption expenditure (HFCE).	Addition
Insurance	Derived from itemised HFCE.	Deduction
Welfare neutral goods	Derived from itemised HFCE. Followed the assumption of Lawn (2013) that 25% of alcohol consumption and 80% of tobacco and narcotics consumption were purchases likely to be welfare declining.	Deduction
Costs of maintaining dwelling services	Derived from itemised HFCE – water infrastructure and other dwelling services, e.g. waste.	Deduction
Consumer durables	Aggregated value of purchases of cars, houses, and appliances in HFCE from previous five years multiplied by 0.2 as per approach of Kenny et al. (2019).	Deduction
Household repairs and maintenance	Derived from itemised HFCE.	Deduction
Income inequality adjustment (INQ)	Index-derived adjustment based on extent of the Gini coefficient deviation from baseline – lowest year of income inequality (2014) given a base value of 100.	Deduction
Education	Itemised expenditure by central government in GDP calculation.	Addition
Healthcare	Itemised expenditure by central government in GDP calculation.	Addition
Local government services	Itemised expenditure by local government in GDP calculation, relating to health, education, recreation, social protection, housing and community amenities, environmental protection, public order and safety, defence, and other public services.	Addition
External benefits from higher education	Benefit transfer approach – annual number of Icelandic college graduates (ISCED (2011) Levels 5–8) multiplied by annual social payoff as per Talberth et al. (2007) study.	Addition
Value of leisure time	To calculate the measure for leisure time, the method applied by Talberth et al. (2007) was utilised, leading to an imaginary base year with mean leisure time of 1,770 hours per person (derived by assuming a 40-hour work week and five weeks of annual vacation time for a total of 235 working days). Adjusted mean leisure time per person was multiplied by the total number of workers in the labour force to arrive at a total number of leisure hours for the nation per annum, which was multiplied by the mean gross hourly wage rate in the private sector.	Addition

Sub-indicator	Summary of calculation method (sources are Statistics Iceland unless stated)	Addition / deduction
Value of unpaid labour in the volunteering sector	Although data is limited for Iceland, the most recent completed study of the World Values Survey, Wave 4 (Inglehart et al., 2014), estimated that 29% of Icelanders took part in voluntary work in 2014. Scaled to the Icelandic population and assuming mean volunteering hours of 89 per volunteer per year in line with the US national estimate of 2018, the total number of Icelandic volunteering hours was multiplied by the mean gross hourly wage rate in the private sector.	Addition
Value of transportation infrastructure	Aggregated annual government expenditures in GDP on road, water and air transportation, infrastructure, and maintenance.	Addition
Value of energy and water infrastructure	Aggregated annual government expenditures in GDP on electricity, non-electric energy generation and the water supply.	Addition
Waste treatment by sewer infrastructure	Aggregated annual government expenditures in GDP on waste and water waste management.	Addition
Housing development	Aggregated annual government expenditures in GDP on housing development.	Addition
Construction	Aggregated annual government expenditures in GDP on construction.	Addition
Non-renewable resource depletion	The 'transition cost' approach delineated by O'Mahony (2021) for Spain's Index of Sustainable Economic Welfare was used to approximate the costs of replacing fossil fuel consumption with renewable energy sources. An input cost of €575.99 per tonne of oil equivalent in 2010€ was used, which was equal to 139,438 ISK per tonne of oil equivalent in 2023 prices.	Deduction
Avoided depletion	Avoided depletion costs approximated by annual government expenditure in GDP on protection of biodiversity and landscape.	Deduction
Air pollution	Mortality and welfare cost of exposure to fine particulates. Estimated to be 0.42 % of Icelandic GDP per annum.	Deduction
Climate change contribution	Quantity of man-made greenhouse gas emissions multiplied by the estimated social cost of carbon of \$185/tonne by Rennert et al. (2022), which was equal to 27,481 ISK per tonne in 2023 prices.	Deduction
Solid waste	Volume in tonnes of total waste generation multiplied by external cost of Icelandic waste generation in the study of Kinnaman (2009), which was 3,288 ISK per tonne in 2023 Icelandic prices.	Deduction

Sub-indicator	Summary of calculation method (sources are Statistics Iceland unless stated)	Addition / deduction
Unemployment	Total unprovided hours of individuals aged 16–74 multiplied by gross mean private sector wage (ISK/hr).	Deduction
Crime	Total annual government cost of operating prisons and law courts in Iceland.	Deduction
Commuting	Aggregation of the direct cost of commuting, indirect time spent commuting to work, and direct costs of public transportation. Commuting cost calculated by multiplying annual commuting distance by cost of driving per km and the number of vehicles owned by households. Cost per one km of driving was calculated through the calculation of average cost of fuel per km in Iceland (Global Petrol Prices, 2024). The indirect cost of commuting times was obtained by the approximate amount of time spent reaching work multiplied by the mean gross hourly wage for full-time work in the private sector.	Deduction
Vehicle accidents	The approach of Kubiszewski et al. (2015) was followed, whereby the cost of vehicle accidents equalled number of deaths (Samgöngusófa, 2024) multiplied by cost per accident. The road administration conducted a study in 2013 on the cost of deaths in a car accident (Sigþórsson and Hilmarrsson 2014), which calculated not only individual cost, but also reflected the social cost of an accident to arrive at an estimated VSL.	Deduction

SOURCE Adapted from Cook and Davíðsdóttir (2021)

TABLE A.2 GPI Calculation Breakdown (all values in million ISK, 2023 prices)

		Household consumption and inequality				Defensive and Household Investments (HI)		Public provision of services (pP)		
CPI Inflation (indexed to 100 for 2023)	Year	Household final consumption expenditure	Income Distribution (Index based on Gini, 2014=100)	PC adj. for Inc. Distribution	Defensive regrettable expenditures (DEFR)	Consumer durables, household repairs, maintenance and education expenses	National gov. expenditure on education	National gov. expenditure on healthcare	Local government expenditure	Market-Based Welfare (Total)
287.6	2000	1,208,711	117.27	1,030,671	48,683	106,107	56,852	166,167	239,142	1,360,842
273.4	2001	1,206,347	117.89	1,023,276	50,628	78,854	63,769	170,851	267,381	1,415,445
256.9	2002	1,186,513	118.91	997,820	51,842	73,712	66,288	188,134	279,762	1,426,417
244.2	2003	1,207,689	117.98	1,023,659	52,633	90,640	70,215	198,537	270,471	1,441,441
239.2	2004	1,310,823	106.17	1,234,676	54,465	112,469	74,322	202,677	292,829	1,647,266
231.8	2005	1,437,046	110.57	1,299,640	59,133	153,674	78,587	209,622	307,541	1,702,930
222.9	2006	1,539,310	115.86	1,328,606	63,476	149,940	81,960	212,774	358,518	1,797,654
208.9	2007	1,611,169	123.35	1,306,197	65,155	157,482	86,514	228,259	376,919	1,817,394
198.8	2008	1,636,692	120.26	1,360,913	66,331	102,627	90,838	229,891	416,258	1,957,412
176.5	2009	1,473,502	130.40	1,130,017	65,678	51,672	84,545	231,102	365,446	1,721,115
157.3	2010	1,359,899	113.22	1,201,156	60,980	48,404	76,654	209,988	327,690	1,718,873
149.3	2011	1,366,198	103.96	1,314,097	62,241	57,052	76,575	207,076	328,817	1,811,821
143.5	2012	1,415,749	105.73	1,339,062	63,861	68,125	77,908	211,902	336,356	1,840,392
136.4	2013	1,410,337	105.73	1,333,944	62,422	66,535	79,117	222,360	345,437	1,858,886
131.3	2014	1,432,148	100.00	1,432,148	62,214	75,054	78,610	228,622	359,526	1,961,639
128.7	2015	1,477,971	109.25	1,352,820	63,166	93,512	83,318	234,427	374,649	1,901,804
126.7	2016	1,568,257	106.17	1,477,155	67,207	110,740	87,437	261,615	393,958	2,052,556
124.6	2017	1,648,829	113.22	1,456,358	68,704	120,228	92,602	279,651	460,948	2,122,682
122.5	2018	1,751,974	106.17	1,650,200	71,228	115,013	91,430	304,169	469,075	2,339,451

Household consumption and inequality					Defensive and Household Investments (HI)		Public provision of services (PP)			
CPI Inflation (indexed to 100 for 2023)	Year	Household final consumption expenditure	Income Distribution (Index based on Gini, 2014=100)	p.c adj. for Inc. Distribution	regrettable expenditures (DEFR)	Consumer durables, household repairs, expenditure on maintenance and education expenses	National govt. expenditure on healthcare	Local government expenditure	Market-Based Welfare (Total)	
119.3	2019	1,811,091	106.61	1,698,834	72,518	98,877	95,678	314,521	478,464	2,426,725
115.8	2020	1,815,393	109.25	1,661,670	75,777	101,789	109,335	309,460	503,906	2,421,840
112.5	2021	2,012,280	107.49	1,872,080	76,392	119,454	103,812	335,358	535,181	2,664,229
107.8	2022	2,328,230	106.61	2,183,918	74,717	138,794	100,036	347,097	585,938	3,016,713
100.0	2023	2,553,453	107.05	2,385,325	71,194	133,922	101,123	351,954	595,024	3,241,815

TABLE A.2 GPI Calculation Breakdown (all values in million ISK, 2023 prices) – Continuation

Year	Services from capital assets (KH, KS, KB & KN)				POL	SOC	Cost of pollution economic activity	Cost of Environmental and social costs (Total)	Total GPI	GDP	National population (Number)	GPI per capita	GDP per capita
	Social capital	Built capital	Human capital	Services from Capital Assets (Total)	Depletion of natural capital								
2000	947,560	52,053	5,220	1,004,833	117,487	124,954	235,514	477,955	1,887,719	2,040,697	279,049	6.76	7.31
2001	1,012,611	59,142	5,875	1,077,628	109,873	122,803	225,523	458,199	2,034,874	2,193,345	283,361	7.18	7.74
2002	1,000,440	56,012	6,264	1,062,717	114,519	125,465	227,647	467,632	2,021,502	2,194,286	286,575	7.05	7.66
2003	1,056,070	61,140	7,219	1,124,429	113,064	124,270	193,034	430,368	2,135,502	2,140,982	288,471	7.40	7.42
2004	1,101,602	61,484	8,150	1,171,236	119,550	127,998	214,804	462,351	2,356,152	2,321,247	290,570	8.11	7.99
2005	1,315,939	58,824	8,427	1,383,189	115,410	124,502	244,446	484,357	2,601,762	2,460,390	293,577	8.86	8.38
2006	1,482,872	66,946	9,742	1,559,561	121,573	141,356	279,198	542,127	2,815,088	2,731,876	299,891	9.39	9.11
2007	1,621,016	67,267	10,175	1,698,458	127,309	150,504	259,115	536,929	2,978,923	2,897,202	307,672	9.68	9.42
2008	1,680,089	88,118	10,625	1,778,832	117,454	162,772	263,425	543,651	3,192,592	3,159,380	315,459	10.12	10.02
2009	1,341,147	74,258	9,904	1,425,309	109,368	151,815	218,409	479,592	2,666,832	2,870,743	319,368	8.35	8.99
2010	1,118,842	55,271	11,784	1,185,897	106,373	148,559	186,579	441,511	2,463,259	2,644,497	317,630	7.76	8.33
2011	1,113,118	51,622	12,381	1,177,121	105,312	142,681	183,777	431,770	2,557,171	2,634,452	318,452	8.03	8.27
2012	1,333,319	51,313	11,761	1,396,393	104,327	142,726	191,330	438,383	2,798,403	2,648,174	319,575	8.76	8.29
2013	1,410,716	46,973	11,536	1,469,225	110,768	143,137	193,122	447,027	2,881,084	2,687,673	321,857	8.95	8.35
2014	1,379,737	47,515	12,303	1,439,555	110,722	142,964	176,098	429,784	2,971,410	2,739,391	325,671	9.12	8.41
2015	1,476,895	49,816	12,649	1,539,360	121,293	146,074	177,886	445,253	2,995,911	2,974,755	329,100	9.10	9.04
2016	1,627,469	58,681	13,174	1,699,324	133,491	146,426	186,734	466,651	3,285,230	3,182,774	332,529	9.88	9.57
2017	1,780,148	63,619	12,926	1,856,693	147,514	149,789	183,229	480,532	3,498,842	3,291,353	338,349	10.34	9.73
2018	1,853,974	78,208	12,632	1,944,814	157,467	152,718	196,226	506,411	3,777,854	3,483,967	348,450	10.84	10.00
2019	1,870,435	71,468	12,603	1,954,506	138,709	150,178	209,247	498,134	3,883,097	3,609,532	356,991	10.88	10.11
2020	1,906,200	77,587	13,018	1,996,805	82,491	141,978	262,193	486,661	3,931,984	3,392,266	364,134	10.80	9.32
2021	1,999,238	84,093	15,031	2,098,363	82,425	147,107	259,899	489,431	4,273,161	3,690,776	368,792	11.59	10.01
2022	2,156,018	80,820	15,741	2,252,578	82,065	148,903	223,507	454,475	4,814,816	4,380,092	376,248	12.80	11.64
2023	2,255,965	85,583	15,741	2,357,289	82,566	150,931	221,819	455,316	5,143,788	4,862,942	387,758	13.27	12.54