An Roinn Oideachais
Department of Education

Note on use of GDP and modified GNI as a measurement of public expenditure on education in Ireland

Introduction

The OECD's Education at a Glance 2022 (EAG) provides a comprehensive set of indicators to measure and compare educational performance across countries. It is organised thematically in four chapters:

A. The Output of Educational Institutions and the Impact of Learning

B. Access to Education, Participation and Progression

C. Financial and Human Resources Invested in Education

D. Teachers, the Learning Environment and Organisation of Schools

The EAG report is accompanied by a Country Note for Ireland (written and published by the OECD) which discusses selected indicators from the EAG and comments on Ireland's position relative to other OECD member countries.

With regards to public expenditure on education there are two main indicators of expenditure presented in the EAG:

- Public expenditure on education as a percentage of total public expenditure; and
- Total expenditure on education as a percentage of GDP

For the purposes of EAG, public expenditure on education includes expenditure not only on core educational goods and services such as teaching staff, school buildings, school books and teaching materials, but also expenditure on peripheral educational goods and services such as ancillary services, general administration and other activities.[1] Public expenditure at all levels of education from primary to further and higher education is covered. Furthermore, education expenditure by all government departments and agencies is included, which for Ireland includes such items as the Back to Education Allowance administered by the Department of Social Protection.

Total expenditure on education is made up of public expenditure (excluding grants paid to students), international expenditure on education, and household expenditure on education.

[1] OECD Handbook for Internationally Comparative Education Statistics: concepts, standards, definitions and classifications: http://dx.doi.org/10.1787/9789264279889-en

These are useful indicators to build up a picture of the education landscape in any country and the OECD has developed a sophisticated methodology to improve consistency in cross-country comparisons.

However, a number of limitations remain in using these indicators when making comparisons across countries, and in examining the Irish context in particular.

A time series of both expenditure measures is presented in the table below.

Table 1 Education expenditure as a percentage of public expenditure & GDP in Ireland, 2014 – 2019

	2014	2015	2016	2017	2018	2019
Total public expenditure on education €m	9,279	9,465	9,635	9,988	10,541	11,153
Total public expenditure €m	73,242	76,356	75,791	77,802	82,587	86,286
Education expenditure as % total public expenditure	12.7%	12.4%	12.7%	12.8%	12.8%	12.9%
OECD average	11.0	10.9	11.0	10.6	10.7	10.6
Total expenditure on education €m	9,233	9,461	9,721	10,164	10,748	11,306
GDP €m	194,934	262,800	270,058	296,925	326,043	356,526
Education expenditure as % GDP	4.7%	3.6%	3.6%	3.4%	3.3%	3.2%
OECD average	5.1	5.0	5.0	4.9	4.9	4.9
GNI*	148,848	161,898	172,235	182,959	193,975	210,736
Education expenditure as % GNI*	6.2%	5.8%	5.6%	5.5%	5.4%	5.3%

Note 1: There is a break in the series on public expenditure on education for Ireland between 2014 and 2015 arising from revisions submitted to the OECD; data for 2015 – 2019 is on the revised basis while 2014 is on the old basis. The revisions reduced public expenditure by 1.35% in 2015.

Note 2. Both public expenditure and total expenditure are compiled according to OECD Handbook for Internationally Comparative Education Statistics: concepts, standards, definitions and classifications: http://dx.doi.org/10.1787/9789264279889-en . There are components of total public expenditure on education that are not included in total expenditure on education (e.g. grants to students).

Note 3. Both GDP and GNP and the related indicators in the above table are the most recent data published on the OECD website.

Total public expenditure on education stood at €11.2 billion in 2019, the most recent year for which data has been compiled, representing an increase of €612 million on 2018, or 5.8 per cent. In 2019 public expenditure on education stood at 12.9 per cent of total public expenditure, up from 12.8 per cent in 2018. As can be seen, this percentage spend compares very favourably with the OECD average of 10.6 per cent. Across all OECD member countries this percentage varies from a high of 17.4 per cent for Chile to a low of 6.9 per cent for Greece (a full list of public expenditure on education as a percentage of total government expenditure in OECD member countries is presented in Appendix 1).

However when measuring total expenditure on education as a percentage of GDP Ireland compares less favourably. The most recent data on the OECD website shows total GDP for Ireland in 2019 stood at €357 billion. Total expenditure on education, at €11.3 billion represented 3.2 per cent of GDP. This was down from 3.3 per cent in 2018, and from 4.7 per cent in 2014. As can be seen, this fall in expenditure as a percentage of GDP was driven not by a fall in total education expenditure (which has risen by 22.5 per cent over the period 2014 to 2019), but by the marked rise in GDP between 2014 and 2015.

For many years, there have been questions raised regarding the use of GDP as the most appropriate measure of the size of the Irish economy. The marked increase in GDP between 2014 and 2015, €194.9 billion to €262.8 billion, a rise of €67.9 billion or 34.8%, raised further questions on this matter. Such a large increase in GDP caused many commentators to question the accounting standard underlying this measure and to suggest that it was seriously deficient in providing an understanding of what was really going on in individual economies.

The limitations in using GDP for Ireland

Gross Domestic Product (GDP) can be considered as a measure of the value of goods and services produced within the economic territory of a country. Due to the particular dynamics of the Irish economy GDP has long been regarded as a less useful measure of economic activity given the globalised nature of the economy and the significant share of the economy that is made up of profits generated by multi-national corporations. Gross National Product (GNP) on the

other hand is the measure of those goods and services that can be attributed to the citizens and corporations of that territory; it is arrived at by adjusting GDP for factor income to and from abroad and has been considered by some to be a more appropriate measure of the size of the Irish economy. An associated measure, Gross National Income, is GNP further adjusted for EU taxes and subsidies.

Between 2014 and 2015 Ireland's GDP and GNP both increased rapidly. This change in GDP and GNP came about following the relocation to Ireland of substantial balance sheets of intellectual property and aircraft for international leasing activities. Following recent methodological changes arising from the introduction of the ESA 2010 (European System of Accounts, which replaced ESA 1995) these IP assets were then included in the Irish Economic Accounts and the associated calculation of GDP. The data is presented in Table 2.

Table 2 GDP to GNI, 2014 – 2019, at current prices

	2014	2015	2016	2017	2018	2019
GDP €m	195,085	262,976	270,205	297,763	326,631	356,705
Net factor income from abroad €m	-31,113	-61,780	-50,842	-62,039	-74,463	-80,774
GNP €m	163,973	201,196	219,363	235,724	252,168	275,931
% change		22.7	9.0	7.5	7.0	9.4
EU subsidies and taxes (net) €m	1,043	1,244	993	1,071	1,133	1,133
GNI €m	165,016	202,440	220,356	236,796	253,301	277,064
% change		22.7	8.9	7.5	7.0	9.4

Note: the figures for GDP in Table 2 are sourced from the CSO website and therefore differ slightly from those in Table 1 which are sourced from the OECD website.

The 2015 National Accounts results, published in July 2016, showed a 22.7 per cent increase in GNP between 2014 and 2015. Commenting on the data in

October 2016 the OECD said 'Globalisation combined with a growing importance of intangible assets creates issues in relation to the appropriate allocation of production and value added to countries. The relocation of such activities within MNEs may have a significant impact on the levels and the growth rates of GDP. Although it represents a certain economic reality, it goes without saying that it makes it much harder to interpret economic developments appropriately. It also makes it much more important not to derive incorrect conclusions from the developments of GDP. One cannot put developments on (material) well-being on a par with economic growth. For this purpose, one should rely on other indicators from the system of national accounts and look at broader measures of well-being' (Irish GDP up by 26.3% in 2015? OECD, October 2015).

In a paper in December 2016 the economist John FitzGerald says *'In the case of Ireland, the problems with the national accounts, especially the shift to ESA 2010, have manifested themselves in a particularly remarkable way, giving rise to a growth in GDP in 2015 that is considered "incredible". The GDP data are fully consistent with the ESA 2010, and the "incredible" result arises from a correct implementation of the accounting standard. The fact that it is incredible reflects a problem with the underlying accounting framework, not with a failure to apply the appropriate standards'* (Problems with the Irish National Accounts and Possible Solutions, John FitzGerald, TCD, 9 December 2016).

Following the publication of the results the CSO convened the Economic Statistics Review Group chaired by Philip Lane, then Governor of the Central Bank, to examine the issue. The group, which included representatives from academia, policymakers, analysts, regulators, and business and trade union bodies, was charged with providing recommendations to the Central Statistics Office (CSO) on how best to meet user needs for greater insight into Irish economic activity. The aim was to examine the measurement challenges inherent in providing a comprehensive picture of the Irish economy in the face of increased levels of globalisation. The group met between September 2016 and November 2016 and submitted a report to the CSO in December of that year.

The ESRG published a paper on the CSO website in February 2017 where they recommended, among other things, the development of an economic indicator, to be called Modified Gross National Income (GNI*), that would provide a measure of the size of the Irish economy adjusted to lessen the impact of globalisation activities that disproportionately affect Irish economic aggregates. (Report of the Economic Statistics Review Group, (ESRG), December 2016).

GDP, GNP and GNI are all measures defined with the European System of Accounts 2010 (ESA 2010). GNI* has been specifically compiled for the Irish economy. GNI* is defined as GNI less factor income of redomiciled companies, less depreciation on R&D service imports and trade in intellectual property, and less depreciation on aircraft leasing. It is designed to specifically exclude the impact of re-domiciled companies and the depreciation attributable to relocated capital assets in order to give a more accurate measure of the size of the Irish economy. Accordingly GNI* is now considered to be a more precise indicator of the domestic economy than other available measures (CSO, 2021).

A time series of GDP through to GNI* is presented in Table 3.

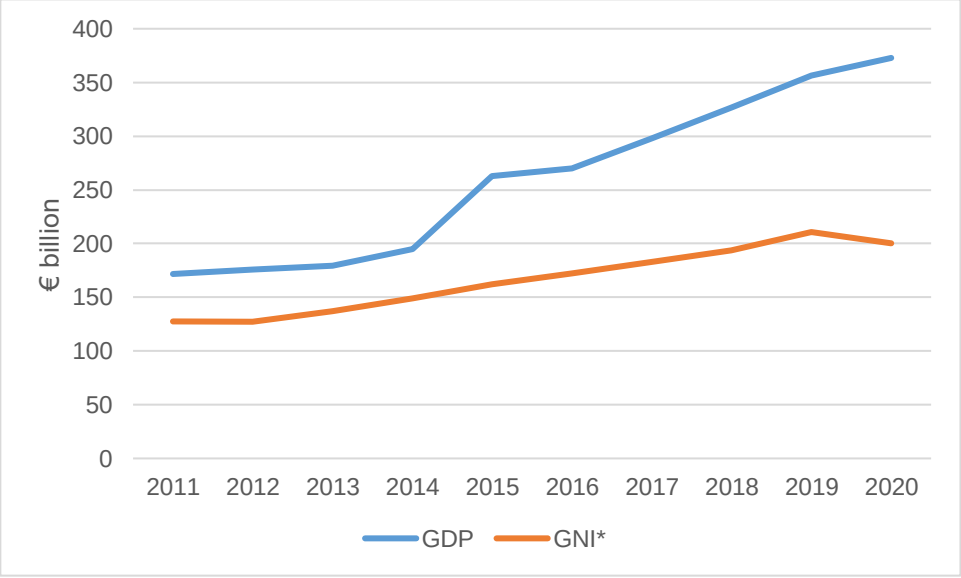
Table 3 GDP to GNI* 2014-2019

	2014	2015	2016	2017	2018	2019
GDP €m	195,085	262,976	270,205	297,763	326,631	356,705
Net factor income from abroad €m	-31,113	-61,780	-50,842	-62,039	-74,463	-80,774
GNP €m	163,973	201,196	219,363	235,724	252,168	275,931
EU subsidies and taxes (net) €m	1,043	1,244	993	1,071	1,133	1,133
GNI €m	165,016	202,440	220,356	236,796	253,301	277,064
Factor income of redomiciled companies	-6,851	-4,663	-5,780	-4,457	-4,912	-4,862
Depreciation on R&D service imports and trade in IP €m	-5,535	-31,272	-37,477	-44,153	-47,885	-52,833
Depreciation on aircraft leasing €m	-3,783	-4,607	-4,865	-5,227	-6,529	-8,634
GNI* €m	148,848	161,898	172,235	182,959	193,975	210,736
% change		8.8	6.4	6.2	6	8.6

Since the development of GNI*, it has been increasingly regarded as a more accurate measure of the size of the Irish economy. Government publications now use GNI* in their reporting. The recently published National Development Plan (NDP) 2021-2030 uses GNI* as a measure of the size of the Irish economy as recommended by the Economic Statistics Review Group. The Expenditure Report 2022 from Budget 2022 also uses GNI* instead of GDP in order to provide a more accurate picture of the actual performance of the Irish economy. The ESRI published a paper in October 2020 comparing Irish health expenditure internationally which makes extensive use of GNI*.

Figure 1 below shows a comparison of Gross Domestic Product (GDP) and Modified GNI (GNI*) in Ireland from 2011 to 2020. The difference between GDP and GNI* is noticeable, particularly over time. In 2020 GDP at current prices is €373 billion while GNI* is €200 billion at current prices. The difference between the measures has grown significantly since 2014 when it was €46 billion (31%) compared to €173 billion (87%) in 2020. This can be attributed to the return on foreign direct investment in Ireland. The extent of the divergence between the two measures underlines the need to consider carefully which indicators are the most appropriate to use when measuring the allocation of resources to education or other sectors of the economy. It is considered that GDP is increasingly unsuitable for benchmarking various measures of public expenditure.

Figure 1: Comparison of GDP and GNI in Ireland at current prices 2011-2020*

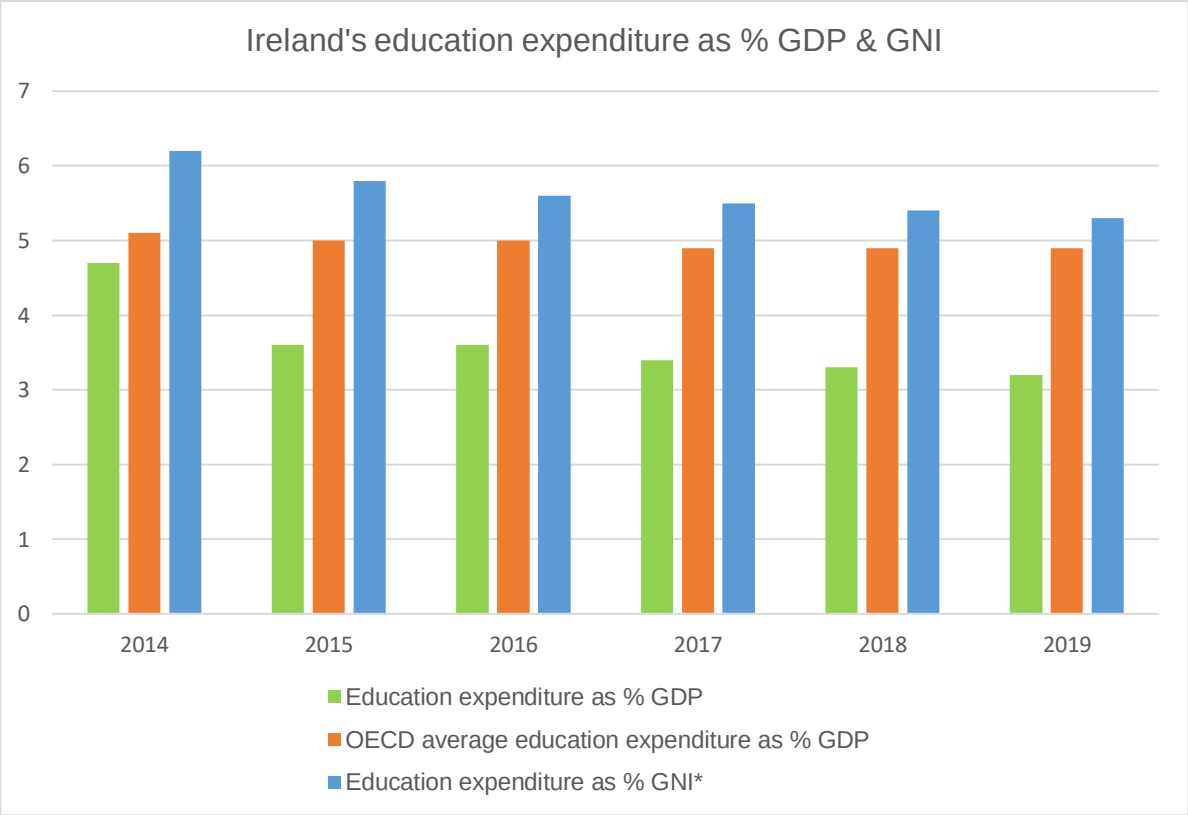


Total education expenditure as a share Of GNI*

Table 4 presents education expenditure as a percentage of GNI*. In 2019 this stood at 5.3 per cent. Although slightly down from 5.4 per cent in 2018 and 5.5 per cent in 2017, it is still well in excess of the OECD average of education expenditure as a percentage of national income, which stood at 4.9 per cent in 2019, as shown below.

Table 4 Total education expenditure in Ireland as a percentage of GNI*, 2014 - 2019

	2014	2015	2016	2017	2018	2019
GDP €m	194,934	262,800	270,058	296,925	326,043	356,526
Total expenditure on education €m	9,279	9,465	9,635	9,988	10,541	11,153
Education expenditure as % GDP	4.7	3.6	3.6	3.4	3.3	3.2
OECD average	5.1	5.0	5.0	4.9	4.9	4.9
GNI* €m	148,848	161,898	172,235	182,959	193,945	210,736
Education expenditure as % GNI*	6.2	5.8	5.6	5.5	5.4	5.3



Volatility of Irish economic output measures

As well as the marked difference between GDP and GNI* in Ireland, the experience has been that these measures have been more volatile in Ireland than in other euro area countries (Meaney et al., 2018). This adds to the difficulty in making international comparisons; Ireland's comparative position can vary significantly over time due to the volatility of measures of the economy, rather than expenditure changes. This explains why Ireland's expenditure in education as a share of economic output shows sharp changes over time, despite increased expenditure.

Measuring quality, outputs and outcomes

Input measurement is just one element in examining education systems; other measures, such as indicators that examine the quality of the system, outputs,

and outcomes are important in making international comparisons and assessing the performance of Ireland's schools, and wider education system.

Ireland ranked fourth in the OECD for participation outside of compulsory education, namely early learning and care. For the 2020 academic year, 100% of 3-5 year olds were enrolled in either early childhood education or primary education. Furthermore, for the transition to adulthood and further/higher education, the enrolment rates (at all levels) among 15-19-year olds in Ireland, at 90 per cent, exceed the OECD and EU22 averages and place Ireland seventh. Ireland shares, in common with some other OECD countries, a pronounced pattern of completion of upper-secondary education and commencement of further and higher education around the age of 18.

The Department of Education also publishes its own indicators report to track the progress of pupils across a wide range of measures, Education Indicators for Ireland 2021 . The report covers all levels of education starting with early learning and care and working through school education, further and higher education and through to lifelong learning. By covering a wide range of topics, the report attempts to present not only an overview of the work of the relevant Government Departments, but also to provide indicators of progress on different educational strategies across all of education from early years through to lifelong learning. These indicators also act as a key component of the Performance Budgeting and Revised Estimate Volume (REV) processes. As well as indicators, the Department of Education is expanding its evaluation capacity to ensure that policies and expenditures are effective and efficient, ensuring improved outcomes for learners. Work is ongoing to link data right across the education system to understand learners' pathways and outcomes.

Conclusion

As this paper has outlined, the use of GDP in compiling measurements of public expenditure on education for international comparisons purposes is problematic. GDP overstates the true size of the Irish economy. As it is an internationally used indicator that is compiled using internationally-agreed methodologies, cross country comparisons (e.g. education expenditure to GDP ratio) produced by international institutions will continue to use GDP.

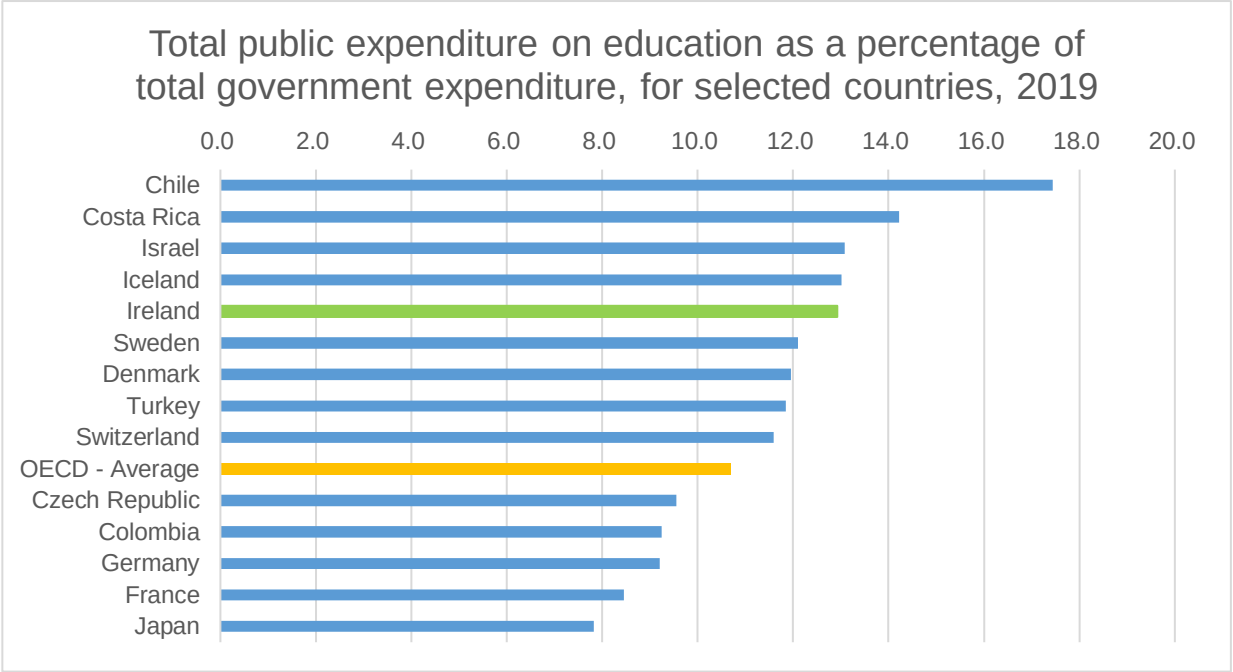
The limitations of GDP in such measurements means that it does not always give a fair representation of the commitment to investment in Irish education and can

lead to incorrect conclusions about the level of public expenditure on education in relation to national income.

In order to address some of the limitations on GDP for such purposes an alternative means of measuring the performance and growth of the Irish economy in a more accurate way has been developed. The modified GNI (GNI*) has been developed to provide a measure of the size of the Irish economy specifically adjusted to lessen the impact of globalisation activities that disproportionately affect Irish economic aggregates. GNI* is being increasingly used to present a clearer picture of the Irish economy and as a measure of the role played by the Exchequer in the economy.

It is recommended that GNI* be used in order to measure the level of investment in education in Ireland over time, to show changes in that investment over time and to present a more accurate picture of the commitment to investment in education by the state.

Appendix 1


Total public expenditure on education as a percentage of total government expenditure, for selected countries, 2019
0.0
2.0
4.0
6.0
8.0
10.0
12.0
14.0
16.0
18.0
20.0
Chile
Costa Rica
Israel
Iceland
Ireland
Sweden
Denmark
Turkey
Switzerland
OECD - Average
Czech Republic
Colombia
Germany
France
Japan

Total public expenditure on education as a percentage of total government expenditure, 2019:

ISC11	Primary to Tertiary education (ISCED2011 levels 1 to 8)
Country	
Australia	11.1
Austria	9.5
Belgium	10.7
Canada	11.1
Chile	17.4
Colombia	9.2
Costa Rica	14.2
Czech Republic	9.5
Denmark	11.9
Estonia	10.6
Finland	9.9
France	8.5
Germany	9.2
Greece	6.9
Hungary	7.1
Iceland	13.0
Ireland	12.9
Israel	13.1
Italy	7.4
Japan	7.8
Korea	12.7
Latvia	9.5
Lithuania	8.9
Luxembourg	7.5
Mexico	13.9
Netherlands	11.4
New Zealand	11.2
Norway	12.4
Poland	9.4
Portugal	10.0
Slovak Republic	9.0
Slovenia	9.5
Spain	8.6
Sweden	12.1
Türkiye	11.6
United Kingdom	11.9
United States	11.7
OECD - Average	10.6

Total expenditure on educational institutions as a percentage of GDP, 2019:

ISC11	Primary to Tertiary education (ISCED2011 levels 1 to 8)
Country	
Australia	6.1
Austria	4.7
Belgium	5.6
Canada	5.7
Chile	6.5
Colombia	5.7
Costa Rica	..
Czech Republic	4.3
Denmark	5.4
Estonia	4.7
Finland	5.2
France	5.2
Germany	4.3
Greece	3.7
Hungary	3.8
Iceland	5.7
Ireland	3.2
Israel	6.2
Italy	3.8
Japan	4.0
Korea	5.3
Latvia	4.3
Lithuania	3.5
Luxembourg	3.3
Mexico	4.6
Netherlands	5.1
New Zealand	5.1
Norway	6.6
Poland	4.5
Portugal	4.8
Slovak Republic	3.9
Slovenia	4.2
Spain	4.3
Sweden	5.5
Türkiye	5.2
United Kingdom	6.0
United States	6.0
OECD - Average	4.9

Appendix 2 – Sources and references

The Central Statistics Office has published a range of reports and papers covering the development of Modified Gross National Income (GNI*) all of which can be found on the following page

https://www.cso.ie/en/csolatestnews/eventsconferencesseminars/resrg/

Among the reports are:

- Report of the Economic Statistics Review Group, (ESRG), December 2016.
- Problems with the Irish National Accounts and Possible Solutions, John FitzGerald, TCD, 9 December 2016

The following report was published on the OECD website

- Irish GDP up by 26.3% in 2015? OECD, October 2015

Other useful references include

A Central Bank report - The Disconnection of GDP from Economic Activity Carried out in Ireland – which can be found here Box C The Disconnection of GDP from Economic Activity Carried out in Ireland (centralbank.ie)

A Department of Finance note - GDP and Modified GNP – Explanatory Note which can be found here 181218123252-71a2c297f26b419fa3696d7349e3e788.pdf (assets.gov.ie)

Education Indicators for Ireland is published annually on the Government's website, gov.ie; the most recent report can be found here:

https://www.gov.ie/en/publication/055810-education-statistics/#latest-statistical-reports