Insights from the World Happiness Report 2005 - 2018

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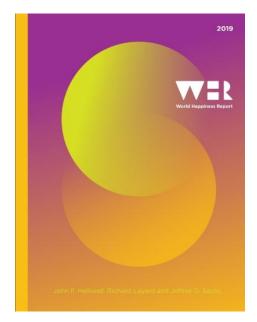
Insights from the World Happiness Report 2005-2018

•	World Happiness Report: A History	3
•	Report Outline	4
•	Some Considerations About the Data	5
•	The Design	6
•	Happiness Makes the World Go Round	10
•	World Overview	11
•	Europe: 2005 - 2018	14
•	The Europe Effect?	15
•	Comparing Ireland to Europe: 2005 - 2018	17
•	Happiness: Locally versus Foreign Born	18
•	Objective and Subjective Happiness in the EU	19
•	Happiness During "The Great Recession" in Europe	20
•	Ireland: 2007 - 2012	22
•	Further Areas of Interest	24
•	Conclusion	25
•	Infographic: Insights from the World Happiness Report	27

World Happiness Report: A History

The term "Gross National Happiness" (GNH) was first introduced in 1972 by the king of Bhutan – Jigme Singye Wangchuck. He said that "Gross National Happiness is more important than Gross National Product" and in this way he introduced an idea that Happiness is the most important value and should be considered more important than, for example economy.

Gross National Happiness in Bhutan was divided into nine domains measured through objective and subjective indicators; psychological well-being, health, time use, education, cultural diversity and resilience, good governance, community vitality, ecological diversity and resilience, living standards. It is most interesting that the first GNH survey in Bhutan was not conducted until 2008.



In 2011, the UN General Assembly put forth Happiness on their agenda. It encouraged member Countries to start measuring Happiness of their Citizens by adopting resolution 65/309, *Happiness: Towards a Holistic Definition of Development*. As a result, the first World Happiness Report was released in 2012 and with the exception of 2014, the reports have been published yearly ever since.

The report outlined the state of World Happiness, causes of Happiness and the impact of policies on these metrics. Each variable reflects a populated-weighted average score on a scale running from 0 to 10 that is tracked over time and compared against other Countries.

These variables currently include: real GDP per Capita, Social support, Healthy Life Expectancy, Freedom to Make Life Choices, Generosity, and Perceptions of Corruption.In addition, each country is compared against a hypothetical nation called Dystopia. Dystopia represents the lowest national averages for each key variable and is, along with residual error, used as a regression benchmark.

Up until recently, GNH was just used as a mere reference, however in May 2019 the Minister of Finance of New Zealand – Grant Robertson decided to allocate annual budget towards improvement of social wellbeing indicators, simultaneously putting social well being ahead of GDP. That makes New Zealand the first Western Country to prioritise overall wellbeing of its Citizens and using Happiness as a measurement of a Country Performance.

Report Outline

The authors have worked on the World Happiness Report dataset and related visualizations as part of a hypothetical presentation to the Department of the Taoiseach in response to a request for domain insight following the New Zealand announcement.

The report will initially examine worldwide data (2005-2018), followed by data specific to Europe for the same period. Happiness scores will be compared between locally versus foreign born people, and people's optimism or pessimism will be investigated by comparing objective and subjective happiness levels. We will look at European data during and after the Great Recession, as well Ireland's position within that time frame.

Three different time frames have been considered across the report:

- Data spanning the full timeframe of collected data: 2005-2018;
- The first five years: 2005-2010 for a quick insight on initial data tied to countries, used similarly to how datasets are checked for their *>head* in mathematical modelling software and comparable to a pulse check on starting metrics;
- The Great Recession and the years following it: two time frames covering 2007-2012 and 2013-2018.

The ancillary folder includes datasets, tableau files containing relevant dashboards and visualizations as well as the infographic.

Some Considerations About the Data

In preparation of the assignment, our group identified a number of potentially suitable datasets. We then met for a full day workshop and brainstorming session where it was agreed on using the data from the World Happiness Report (see ancillary file for the original .csv file containing the dataset). A separate .csv resulting from working on the data, sub setting and calculating metrics for the time frames spanning 2007-2012 and 2013-2018 is also included in the ancillary file. These were then used to analyze how data from the Eurozone changed during the Great Recession of 2007-2017 compared to the following period of recovery and increased economy stability.

Please note that, due to data not being grouped in such a way, countries were filtered to only include the relevant ones. Happiness scores were also calculated as resulting from averaged Year on Year variables. Each variable was then calculated as a percentage of the total before being visualized. We did this in order to offer an insight of fluctuations for each variable over time and as these result in year on year changes for happiness score ranking. Such percentage based visualizations reflect a different calculation of the happiness score than the worldwide ones as well as the out of the box year on year ones.

Our preliminary work then proceeded into establishing design guidelines, farming tasks and setting a two week timeline for the project, a time frame commonly employed in Agile sprints, of which we followed the structure and methodologies.

We analyzed the data in its raw form, supported by the use of whiteboards to map key takeaway points, areas of interest and the feedback from the group. The whiteboards and results of the workshop are included as part of our deliverable and for full visibility into the design process.

Please see the ancillary folder to this report for this data (specifically the folder [From the meeting] Project outline whiteboards).

Similarly, a variety of early visualizations, purely explanatory in nature, have been left in the final .twb files for full insight into our exploratory analysis and the early avenues of exploration the group went through. Many of these visualizations did not make the cut for the report, but we still consider them representative of a broader testing and probing the group went through.

The Design

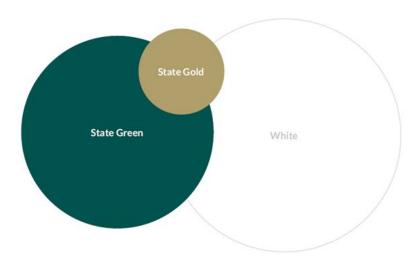
Style consideration have been at the center of the brainstorming phase and workshop. Based on the hypothetical setting for our report, we decided to adapt colors and fonts used by Irish Government as outlined in *Unified Visual Identity Guidelines Version 1.0* (see

<u>https://www.esf.ie/en/ImageLibrary/Repository/Info-and-Pub/Unified-Identity/Government-Of-Ireland-Identity-Guidelines.pdf</u> for the source file). We have added colors to the officially listed ones when suitable and in order to pre-attentively highlight results by Country or scores.

Color:

The main colors used for the report and the visualisations in tableau stem from the governments style guide. The authors chose *White*, *State Green*, *State Gold* as background colors as well as fillings and font color. Also, *yellow* (#ffcf1c), *Pink* (#d10997) and *Blue* (#52a8ff) have been largely employed, with *yellow* being tied mostly to a pre-attentive highlighting function. Additionally, a *dark blue* (#25383d) was used as a background color to create contrasts specifically with regard to the 'happy color' yellow. The authors intended to stay in that color range as far as possible to create an elegant and compact report that expresses a certain feeling of trustworthiness. The rather modest and earthy colors such as *State Green* and *State Gold*, however, were met with brighter yellow and blue tones to highlight the actual topic of the report. The world 'happiness' itself is a very emotional word that asks for bright and exciting colors. Therefore, the choice of moderate background/base is ideal to give room for other, more exciting, colors which at the same time, do not 'take over' the whole concept.

With regard to the graphics used, *dark blue* has been selected for sections focusing on cartography, as it provides a high contrast background that naturally highlights data distribution. *State green* has similarly been employed as a background to our visualizations. Please note that we maintained a white background for our worldwide map in order to differentiate the only non EU-specific item.



	PMS	CMYK	RGB	HEX
State Green	3292	100, 0, 50, 60	0, 77, 68	#004D44
State Gold	872	0, 11, 50, 40	163, 145, 97	#A39161
Black	Process Black	0, 0, 0, 100	0, 0, 0	#000000
Dark Grey	418	0, 0, 12, 75	86, 81, 82	#565148
Light Grey	Warm Grey 1	0, 0, 4, 8	237, 236, 229	#EDECE5



Font:

Additionally, the Irish Government's *Unified Visual Identity Guidelines Version 1.0*, lists *Lato* and *Quadraat OT* as primary fonts. *Arial* and *Georgia* are listed as secondary fonts. Due to availability reasons on the side of the authors as well as other possible stakeholders involved, Arial and Georgia were chosen for the report.

Georgia

Georgia, a serif typeface, is specifically suitable for decorative headlines and can be used as an eye-catcher.

Arial

Georgia, a sans serif typeface, can be better used for plain text, due to its clarity and therefore easy to read.

Layout:

The report is designed on vertical A4 pages. We decided for a vertical layout because of the space that the dashboards take up. They are often positioned at the bottom part of the page so that there is enough space for explanatory text above. The graphical elements (diagonals/triangles) were chosen with reference to the government's style guide. They were initially used to fill the white space of the first pages but later on turn into sequencing marks for the those parts of the report that talk about the world, the EU and Ireland.

Charts and Other Visuals:

Maps:

Due to the nature of the data set and its categorisations according to single countries, maps were predominantly chosen to encompass the sheer amount of information. This tool makes it possible to visualise several features (such as GDP and confidence in national government) for a large amount of countries in one view (see: Happiness During the Great Recession in Europe). A top-down approach led from a whole world view to EU member states and down to Ireland. This way, the authors were able to give a general introduction into the dataset and were afterwards able to focus on specific points of interest that were discussed earlier in the planning stage.

Bar Charts:

Bar charts are specifically useful to illustrate movement over time, often using the filter category 'Year'. Since the report is collecting different features over a time frame of more than 10 years, the movement of the bars present changes in a clear way.

Line Charts:

A line chart is used to compare two features (locally born vs. foreign born). This graphical tool allows to show two different aspects. First, the increase/decrease of happiness among EU countries and second, the happiness score between the two features. It is easy to spot, which country is the happiest and least happy as well as those countries, where locally born are happier than foreign born and vice versa.

Boxplots:

For the comparison of life ladder scores of EU countries across years 2005-2018, we decided that boxplot would be the most appropriate tool. Main advantage of boxplot of this analysis is that it shows how the values in the data are spread out (allowing for visibility into range, minimum and maximum values tied to the data). Another advantage here is that since it takes less space than some other graphs, it's useful in comparing distributions between many groups, in this case – countries.

Happiness Makes the World Go Round

World Overview

The **World Dashboard** consists of three separate worksheets which have been designed and chosen to complement each other, both visually and with regard to the information they communicate. They provide an overview of happiness scores across the globe, country by country; over time, and broken down by UN region.

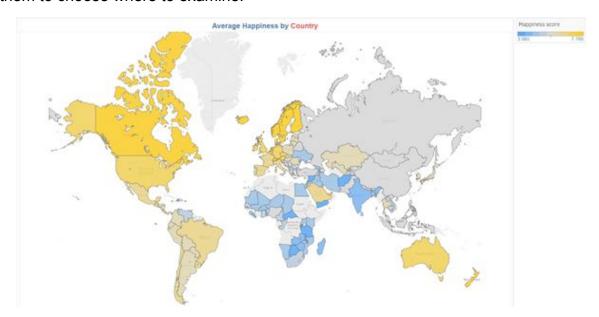
A single filter allows the user to choose to group countries by UN region. The filter allows for all, some or just a single region to be selected and all three visualisations are controlled by the one filter. The UN regions are were each assigned a colour which is used throughout both exploratory / unused visualisations and those which are in the final project.



Fonts across the project are consistent and based on our chosen style guide. The titles are **Bold** but otherwise undramatic, except for the worksheet names which are picked out in **Red** to aid memory retention. The **UN REGION SELECTOR** is also highlighted and in caps for pre-attentive reasons as it is the only filter on the page.

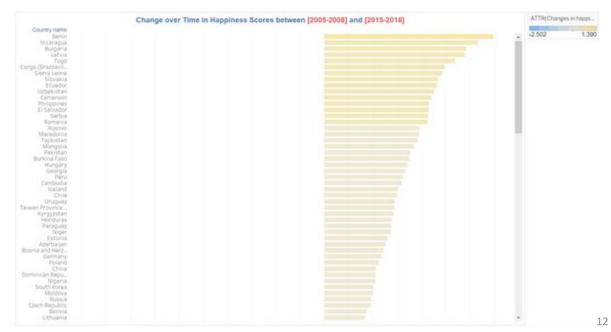
The **Country** worksheet: It was envisaged that this would be one of the first interactive elements of the presentation and as such a macro overview of the globe was chosen to illustrate the range of average happiness scores across the various countries and to allow for an initial visual indication of the broad geographical regions where scores are highest and lower. The range of happiness scores is indicated using a graduated colour scale from blue (low) to yellow (high) which is used consistently across the visualisations.

To allow the user to drill down into the data at this early stage and see the figures for each country, the metrics for happiness and the contributing factors are accessed through tool tips, becoming visible when the cursor hovers over a country. Tool tips were chosen so as not to overwhelm the user with too much information and allow them to choose where to examine.



The **Change over Time** worksheet: The data allows for us to use a bar chart to visualise the change in happiness for countries between an aggregate taken of the period 2005-2008 and the period 2015-2018. A graduated colour scale from blue (negative) to yellow (positive) is again used, calling on the previous visualisation having formed the association in the mind of the viewer. The exact same colours are used as in the scale for consistency and comparison. Although the countries were initially colour coded by UN Region, it was decided that this was visually distracting and so their UN Region was put in a Tooltip. The bars were made slightly opaque to allow sight of the guide lines behind.

Although the visualisation has a lot of negative space, this was mitigated in the Dashboard by compressing it, necessitating a slider for the user to view it in its entirety.

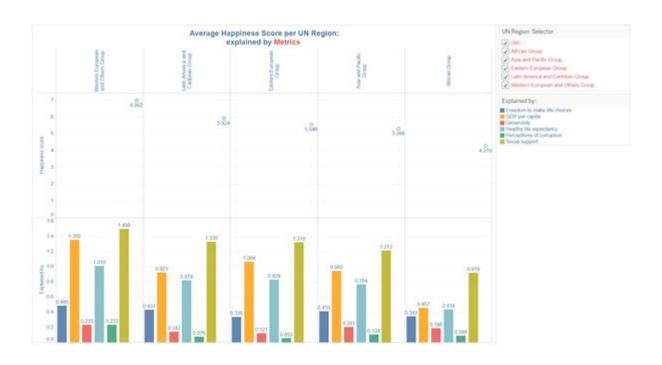


The **UN Regions** worksheet: This visualisation explicitly divides the countries into their respective United Nations Regions and aggregates their data. Each region is diverse in character and so no attempt was made to give each one a characteristic colour that somehow represented the region. Rather, colours were chosen for ease on the eye, clear differentiation and soberness.

The overall aggregated average happiness score for the regions are represented by mark, while the constituent factors which make up the Happiness Score are shown in a bar chart beneath, but on the same scale.

Various visual representations of this data were explored (including Spider Charts, 100% Stacked Bar Charts and Pie Charts) and ultimately rejected for not easily and clearly allowing for direct comparison between the regions.

It was chosen to keep the background colour white to offer a contrast to later visualisations which use a darker background as the investigate the data. As this initial dashboard is explanatory, the emphasis was on neutral, clean presentation of the data. We also attempt to mimic the colouring of our cover page, which starts white and gets darker, in the overall colouring of our group project.

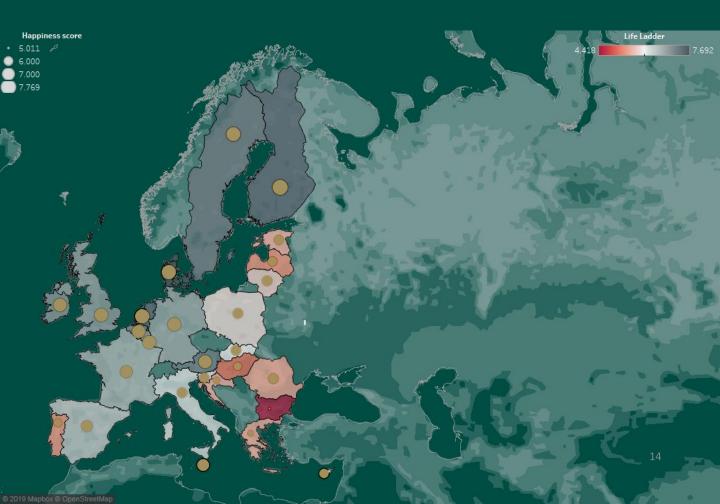


Europe: 2005 - 2018

This map shows average Life Ladder scores across EU compared to the average Happiness score.

Life Ladder is one of the 6 factors contributing to the overall Happiness score, and a parameter measuring subjective well-being (or subjective Happiness score). By comparing it to the calculated Happiness score, we can notice gaps between the idea of perceived vs calculated Happiness for individual Countries. Life Ladder is a scaled measure (ranging 0-10) with 10 equating to the best possible life and 0 representing the worst possible life. This measure is also referred to as Cantril life ladder.

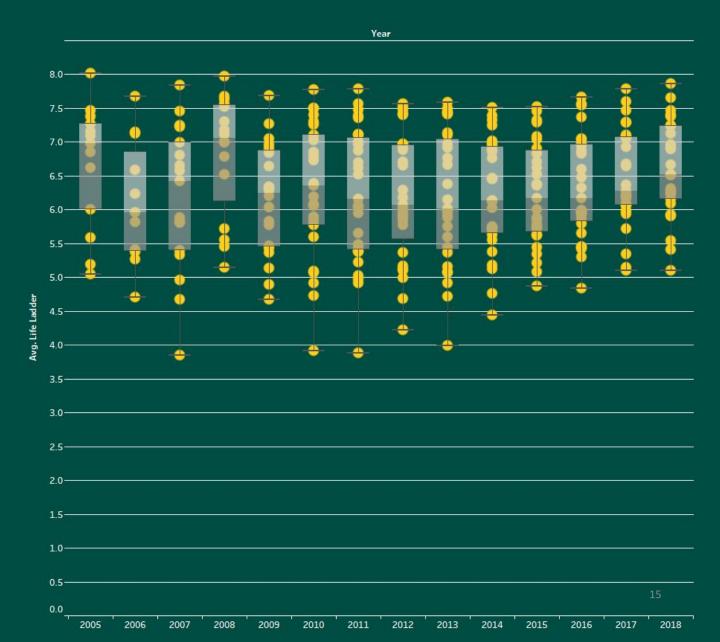
Here, scores were analyzed and data spanning 13 years (2005-2018) compared. We immediately notice that Denmark, Finland, Sweden and Netherlands are tied to the highest ranking Happiness scores as well as life ladder scores. Bulgaria is on average the least happy overall. Further analysis of the raw data shows that starting 2010, Bulgaria ranks as the objectively and subjectively least happy EU country every year.



The Europe Effect?

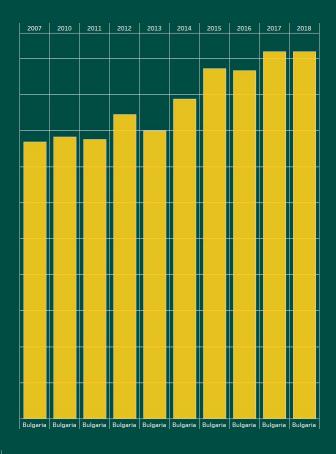
Happiness in Europe reflects an interesting distribution over the course of the 13 years analyzed. When visualizing the data, we notice that in 2007, 2010, 2011 and 2013 the discrepancy between happiest and least happy country was the biggest. Further analysis reveals these countries to have been Denmark and Bulgaria on all those dates. While Denmark is still the happiest EU Country when calculating by all time data, it has been getting lower scores in recent years.

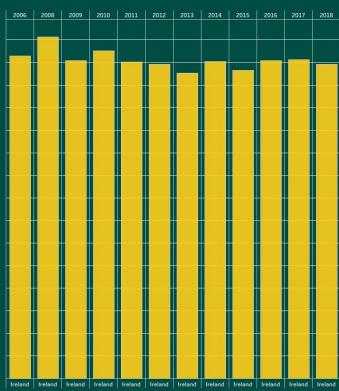
We also noticed that during the past 4 years, the difference between happiest and least happy country has been decreasing, with scores being more evenly distributed across the range.



The Europe Effect - Continued

Bulgaria (to the right) joined the EU in 2007. We interestingly notice marginally increased Happiness scores in subsequent years, then a progressive decrease until 2013. The score then start rising steadily once more.

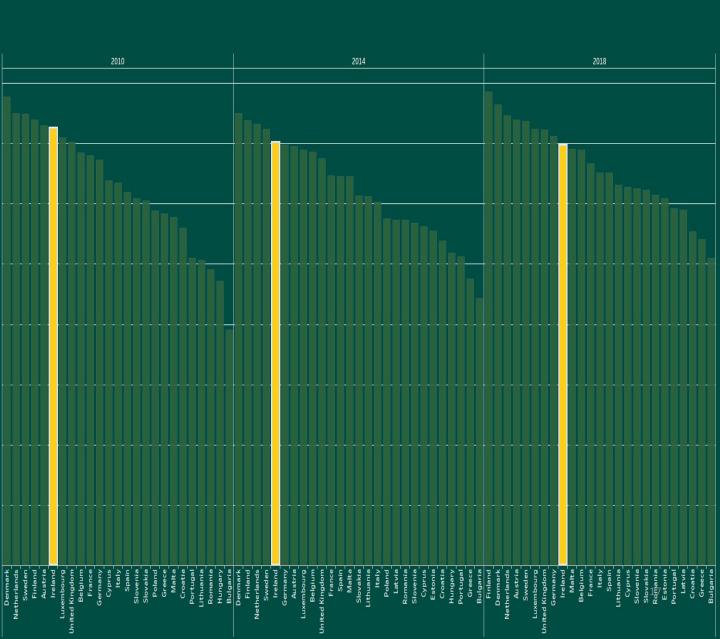




Ireland (to the left) shows a different trend, with its scores progressively decreasing, see a marginal increase in 2014 and drop further the year after. Happiness scores have not recovered since and never reached pre- recession levels. We will expand on recession tied data later on.

Comparing Ireland to Europe: 2005 - 2018

Over the course of the years, Ireland can usually be found in the top 10, even ranking among the Top 5 at times. In the visualization below, we selected a subset of the years ranging 2005-2018 for an easy to parse, series of pulse checks. Interestingly, in 2017-2018, Ireland lost its rank and can now be found at the lower end of the top 10 happiest countries.

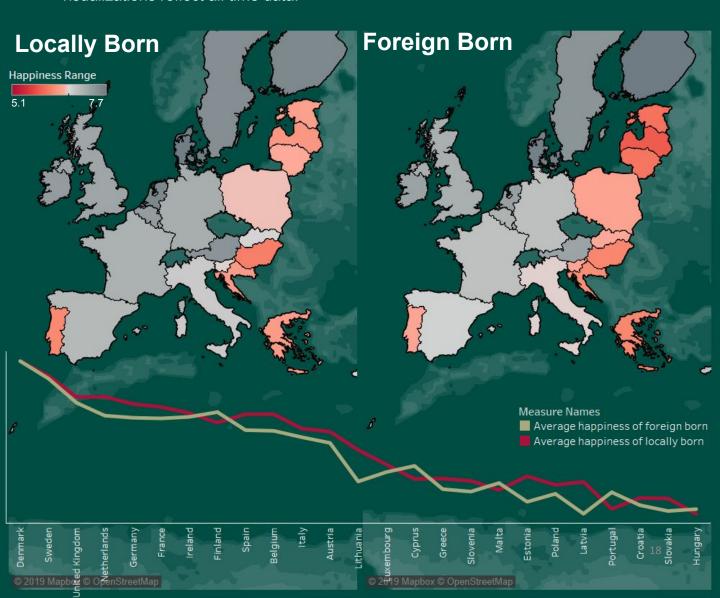


Happiness: Locally versus Foreign Born

Encouraged by the interesting findings related to perceived vs calculated Happiness, and curious to learn more about Hungary's results, we decided to analyse Happiness of Locally vs Foreign Born across EU Country.

These maps show the happiness ranges from people who were born in the given Country (left) and people who migrated (right). The colours show that the Happiness scores more or less align with each other. Denmark is, again, the Country with maximum happiness scores in Europe for both groups. However, Hungarian 'locals' are the least happy, whereas 'foreigners' are least happy in Latvian.

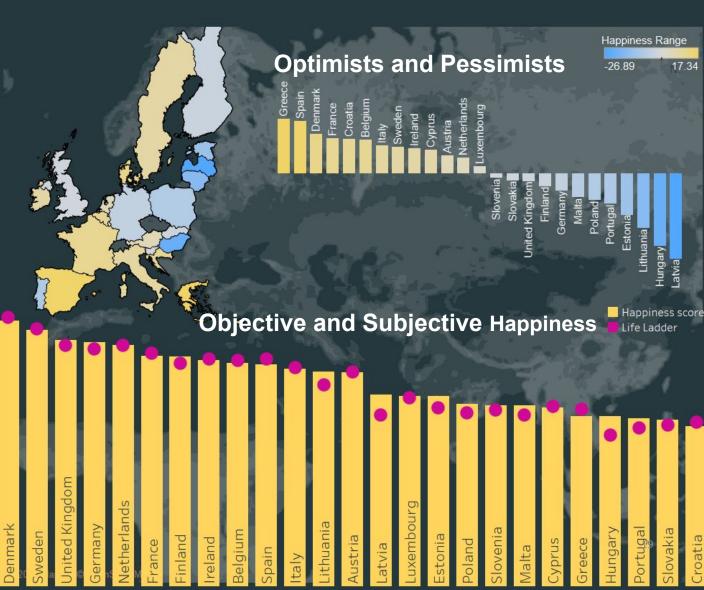
There are only 5 out of 25 countries, where non locally born are happier than locally born, which are: Finland, Cyprus, Malty, Portugal and Hungary. This can be seen in the bottom graph, when the grey line is on top of the red line. The visualizations reflect all time data.



Objective and Subjective Happiness in the EU

Interested by these results, we have developed on our visualization further, based on objectively calculated (Happiness Score) and subjectively perceived (Life Ladder) metrics. We have used our calculations to indicate whether countries are Pessimists or Optimists. The calculation for this data, includes parameters for Foreign Born and Local born nationals, for which unfortunately data tied to Romania and Bulgaria is not available. As such, these countries do not show in this visualization. Similarly, data for Czech Republic was partial and it has been excluded as it would have yielded non representative comparisons. The bottom bar chart shows that based on the data available, the happiest is Country is objectively Denmark and the unhappiest Country is Croatia. However, people in Hungary perceive themselves as the least happy.

The right top bar chart as well as the EU map show who is the most optimistic (Greece) and least optimistic (Latvia) EU country, based on the difference of the Happiness Score and Life Ladder.



Happiness during "The Great Recession" in Europe

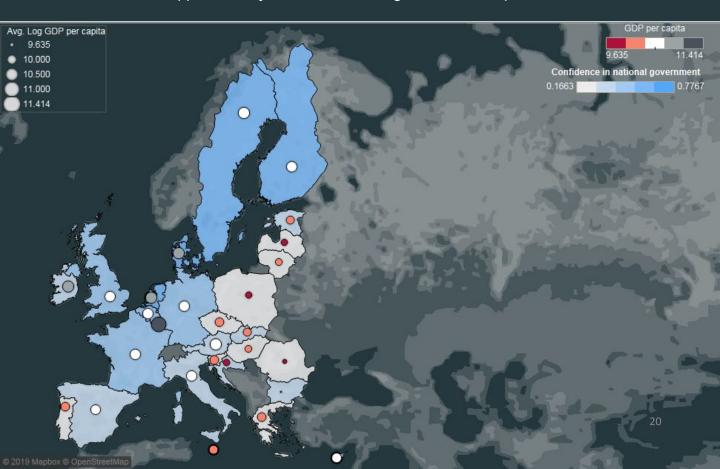
As we have seen so far, the Happiness index is largely based on self-assessed dimensions and the perception of what living in a Country entails for its Citizens as well as for its foreign-born Residents.

While working with the data and analyzing current results, these Authors naturally wondered about the type of fluctuations that may have impacted Europe during the "Great Recession" of 2007-2013 and how did the data change during the following period of recovery.

We used 2007 as a starting date for our analysis, aggregated the variables for the relevant time periods by Country and grouped data in two main periods:

- 2007-2012, spanning from the onset of the crisis into early signs of recovery for most Countries;
- 2013-2018, during which most Countries' economy recovered. Some still dealt with the aftermath of the economic crash.

GDP per capita and Confidence levels are two of the variables contributing to the final calculation for the Happiness score. Per Capita GDP was mapped together with data on Confidence in the Local Governments, with an aim to identify shifts between the two time frames. Below, we see levels of Confidence in National Government, mapped in conjunction with Average GDP for the period 2007-2013.

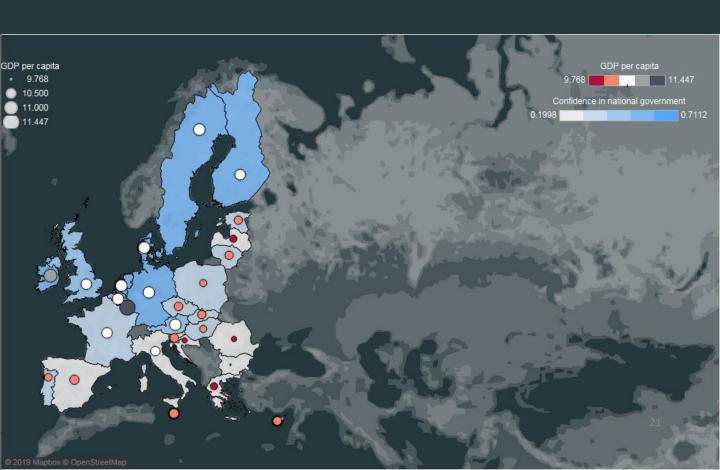


"The Great Recession" Continued: 2013-2018

A closer look at the mapped data for 2013-2018 (below) shows that in a number of Countries, Confidence in the Local Government decreased between the two periods with no correlation to an increased GDP.

This is notably the case of Spain, Italy, France and a number of Countries in the Eastern part of Europe, where the sign of a Recession have extended beyond 2012 (a quick glance at GDP values confirms slower growth).

Austerity measures, a slow recovery and in some cases large emigration flows, would merit their own in depth analysis and separate visualizations. For the purpose of this exercise, we can highlight that there seem to be two main Groupings: Countries where GDP and Confidence in the Local Government increased between 2007- 2012 and 2013-2018 and Countries that saw a decrease in Confidence as the GDP increased.



Ireland: 2007 - 2012

We were similarly interested in exploring how did Ireland's ranking change, how the variables composing its Happiness Index shifted and whether the change was present at all. Ireland entered the recession in 2007, saw a mild recovery during Q4 2007, then plunged back into a two year long recession.

The below bar chart reflects the calculated Happiness ranking across EU Member states over the period 2007-2012, specifically the Top Ten positions. Variables contributing to the Happiness Score have been aggregated and expressed as percentage of the total, contributing to the chart. We see that despite the economic hardships Ireland ranks fifth overall, with similar ranges as the Top Three Countries. The choice of a donut chart has been made as it allows for at a glance breakdown of the individual factors composing Ireland's ranking for the period, by percentage.

We would also like to point out that Life expectancy at birth could be excluded from further Europe centric analysis. This variable is tied to quite uniform values across EU Countries and as such it has close to no differentiating weight when calculating the total score.

100

90

80

70

60

50

40

30

20

10

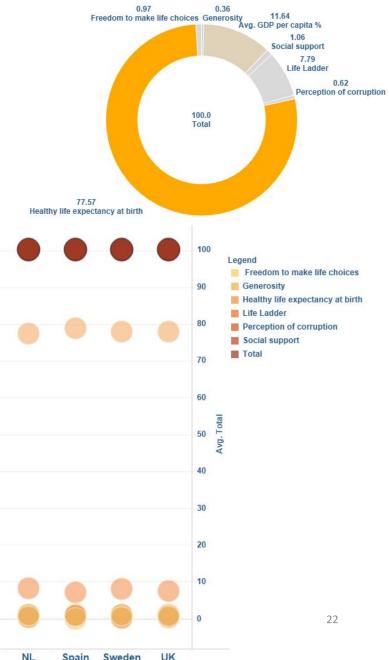
Austria Cyprus Denmark France

Italy

Spain

Sweden

Ireland



Ireland: 2013-2018

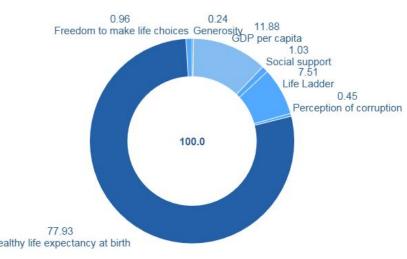
When working with the data, we immediately noticed that in conjunction with its economic Recovery, Ireland lost its place in the Top Five European Countries by Happiness Index.

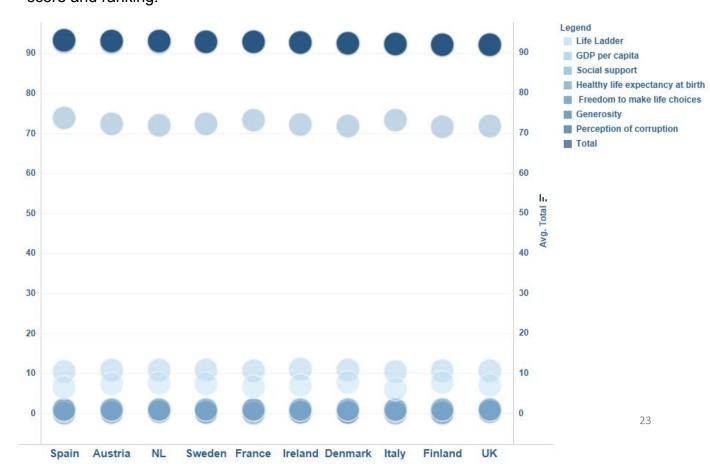
Similarly, Sweden lost the podium, Cyprus is no longer in the top 10 and Italy was demoted to the 8th place.

An analysis of the variables composing the score provides interesting insights. While Ireland's overall Happiness score has overall increased during the second period analysed, its Life Ladder, Social Support and Generosity scores have

decreased by 0.22%, 0.018% and 0.10% respectively.

In order to highlight this decrease in values from the previous period analyzed, we decided to plot the distribution of Factors contributing to the score (below), reflecting spread and range across Country, as well as the composition of the total score for Ireland by percentage, in blue. This is in line with the previously outlined considerations for our color coding, with blue being chosen to represent an overall decrease in Happiness score and ranking.



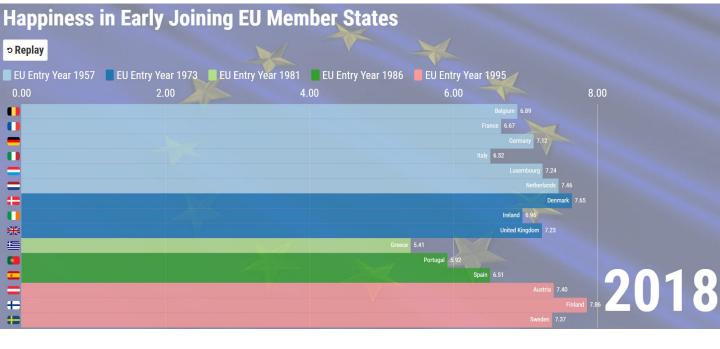


Further Areas of Interest

As we concluded our Analysis, we agreed that it would be interesting to investigate the specifics of how joining EU has impacted the Happiness score of its Countries.

Unfortunately, data is only available from 2005 on and only a handful of Countries joined after that date. As such, any attempt to infer Countries' ranking prior to joining and after joining is almost impossible. There is simply no information on the six variables composing the score that pre- dates 2005.

We would like however to include a dynamic visualization of how has happiness data fluctuated throughout the years, with Country grouping based on year of joining the EU. Our dynamic visualization can be found at the following, **clickable link**. A still reflecting the ranking for 2018 is shown below.



Conclusions

The Happiness index is largely based on self-assessed dimensions and the perception of what living in a Country entails for its citizens as well as for its foreign-born residents. Measuring happiness as an indicator of performance of the country is crucial to assessing and maintaining the well-being of its Citizens.

We compared EU scores ties to Happiness over a period of 13 years (2005-2018). The happiest country overall is Denmark. We think worth pointing out that Sweden and Finland both ranked higher in individual years. The least happy EU Countries over the first five years of data presented in the analyzed set (2005-2010) were interchangeably Latvia, Romania and Bulgaria. Since 2010, Bulgaria has ranked as Least happy country in the EU every year.

Analysing scores across the EU over the periods 2007-2012, spanning from the onset of the Recession into early signs of recovery for most Countries, and 2013-2018, during which most Countries' economy recovered, provides insight into interesting trends.

Confidence in the Local Government decreased across the two periods for a number of Countries. There was no widespread positive correlation of this index to an increased per capita GDP. This indicates that the economic development and stability does not necessarily result in increased trust in Governments, ,nor as a result, in increased Happiness across the board.

We additionally noticed that in the past 5 years, the gap between highest and lowest scoring countries is closing and scores are being more uniformly distributed. We also noticed that while least happy countries are getting happier, Denmark, top happiest country in EU over time, took a fall in 2012 and although it has been recovering, it never reached its highest score since. That score was recorded in 2005.

We found out that when comparing happiness of Locally born Citizens vs. Foreign Born, Eastern European countries such as Poland, Slovakia, Croatia etc. rank the lowest. Denmark is, again, the country with maximum happiness scores in Europe across both groupings. We found interesting that Hungarian 'Locals' are the least happy, whereas 'Foreigners' are least happy in Latvia. Further analysis in cultural and political dimensions would be worthy of its own deep dive.

There are only 5 out of 25 countries, where non locally born individuals are happier than locally born. These are: Finland, Cyprus, Malta, Portugal and Hungary. Additional analysis is required in order to investigate factor impacting happiness of locally and non-locally born Individuals.

We are convinced that, if more countries were to follow into New Zealand's footsteps, we would see increased overall scores and a more even distribution of Happiness scores across the World. Replacing GDP as the success measure of a Country, with its Happiness score(and the variables composing it) may additionally help the Government navigate policy making in times of hardship, predict the outcomes of deliberations in terms of feedback and Citizens' reaction to implemented measures. It would benefit the society as a whole and ensure happier, more participating Citizens.

Infographic HAPPENESS

The infographic shows a selection of information that can be sourced from the world happiness report. It starts by giving an overview of happiness across the world, which then focus more on Europe and the European Union and goes further down to Ireland. This top-down approach was chosen for several reason. The author's intention was to present the full range of valuable information that can be found within the world happiness report, without pointing at every single one of them. Starting from a global point of view, you could for example compare UN regions against each other and investigate who is the happiest, why and when. The question of time reoccurs in the graph including Venezuela and Benin which shows the highest decrease and increase of happiness over the years. With a more limited selection of countries (the EU), aspects could be investigated such as 'Who is the most optimistic or pessimistic country' and how are other factors such as democracy or social support influencing the happiness scores. Lastly, the infographic focuses on Ireland with the intention in mind to present it to an Irish audience. Again, it displays the happiness development over the years which could be a valuable insight to the Irish government.

Visuals:

The general colour scheme of yellow-blue is a strong contrast that helps indicating the happiness level of a country. Yellow stands for relatively high happiness scores in comparison to other countries, regions or points in time, whereas a dark blue or green is chosen to illustrate the opposite. Also, these colours derive from the general idea of the infographic to represent the results in the shape and colour of the world (water and sky).

