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Economic Lessons From The J-value For Covid Response

Prof Philip Thomas, Professor of Risk Management, University of Bristol

Wednesday, 05 July 2023



A Word From Today's Chairman

Professor Michael Mainelli
Chairman
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Today's Agenda



- 11:00 – 11:05 Chairman's Introduction
- 11:05 – 11:25 Keynote Presentation – Professor Philip Thomas
- 11:25 – 11:45 Question & Answer



Today's Speaker

Professor Philip Thomas

Director, Michaelmas Consulting
Ltd

Master of the Worshipful Company
of Scientific Instruments

Visiting Academic Professor
Safety Systems Research Centre

South West Nuclear Hub,
University of Bristol





Economic lessons from the J-value for Covid-response

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J-value website:

<http://www.jvalue.co.uk/>

NREFS Special Issue on Coping with a Big Nuclear Accident:

<https://www.sciencedirect.com/journal/process-safety-and-environmental-protection/vol/112/part/PA>



The meaning of life

- **What do you really, really want?**
- **To live for a long time and enjoy yourself** while you are doing so.
- **So you want to earn lots of money and to live as long as possible.**
- This thought is, **on its own**, enough to define the Judgement- or **J-value**.



Quality of life

- Your "quality of life" will increase with both your **income** and your **life expectancy from now on**.
- Applying **Rayleigh's** method of **dimensional analysis**, **life quality** will then simply be the product of **income** raised to **some power** and **life expectancy** raised to **another power**.



Step 1. We define a life quality index that **increases** with **income** and **life expectancy**, so that, in Rayleigh's form:

$$Q_1 = G^a X^b$$

where G is income and X is life expectancy and a and b are positive constants.

Step 2. We take the b^{th} root

$$Q = Q_1^{\frac{1}{b}} = G^{\frac{a}{b}} X$$

and we now have a **second measure** of life quality that also **increases with income and life expectancy**

Step 3. Now put $\frac{a}{b} = 1 - \varepsilon$ where ε is **risk - aversion** and we have

$$Q = G^{1-\varepsilon} X$$

This is the form of life quality index we shall work with.

Economists call $G^{1-\varepsilon}$ the "**utility of income**" - the **third Ferrari** matters less!

The only equations in the seminar!

Life quality emerges as sum total of our utility over our expected lifetime from now on.



"A short life and a merry one!"

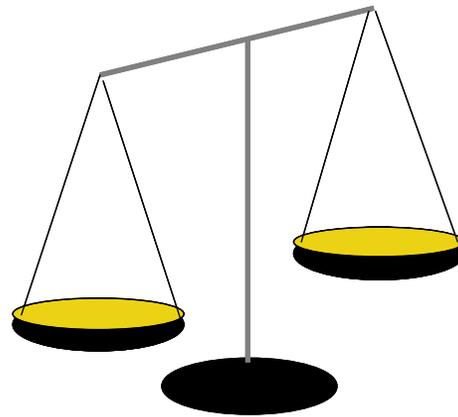
- So said the **Caribbean pirate**, Bartholomew "**Black Bart**" Roberts.
- He recommended the **life of a pirate** to his shipmates as just this: a short life and a merry one.
- What he said seems to have been **true for himself**, at least:
 - **Black Bart's buccaneering life came to an end at the age of 40.**
- Black Bart was pointing to the **trade-off** his men would face between having more **money** (and fun, perhaps) and **living longer**.



The Judgement- or J-value

- The J-value balances the **gain in life expectancy** that a safety measure brings against the **cost** of providing it (which reduces disposable income).

You are spending too much if J is bigger than 1.0



Unique feature: the balance is objective



- The **J-value** is the **ratio** of what you **are spending** or **intend to spend** to the **maximum** that you **ought to spend** before **reducing your life quality**.
- So **J = 1** is fully acceptable, **J = 0.8** means the health or safety measure is **good value for money**, but **J = 2** implies you are **spending twice as much as you should** and you ought to consider other ways of getting similar protection.



Life expectancy: some figures

- **81** is the life expectancy **at birth** in the UK.
- **42** years is the **population-average life expectancy** in the UK.
- **3¼** years is how much life a person living in Harrow, North London **loses** by moving to Manchester.
- **4½** months is how much life a Londoner **loses** as a result of air pollution.
- We can perturb **life tables** to find out the increase in life expectancy a safety measure brings about.

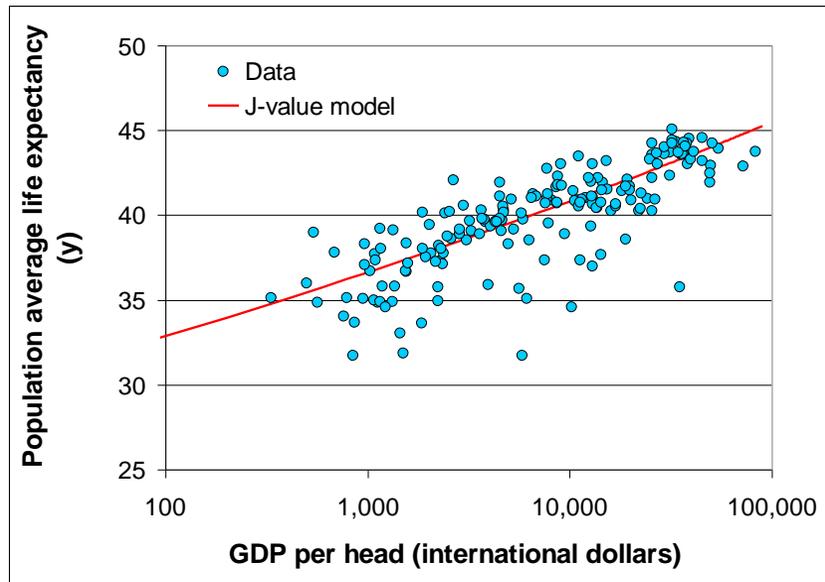


How to test the J-value as a theory?

- Let us suppose that **everyone in every country in the world** is prepared to **spend the same**, smallish **fraction** of their income to extending life, which they spend at a **J-value of 1.0**.
- But **developed countries** are richer, so they have **more money** to spend on extending their lives.
- So people in **developed countries** should **live longer**.
- This is **just what happens**.
- What relationship does the **J-value predict between life expectancy** and **income**, taken to be GDP per head?
- **Proof of the pudding**: does the J-value predict the form of the **Preston curve**?



J-value explains why people in richer countries live longer (180 out of 193 nations in UN)



Correlation coefficient of ~90%

The **J-value** explains **scientifically** why citizens in **richer** countries **live longer**: their citizens **are able** to spend more on things to keep them **alive longer** and **choose** to do so.

Conversely, if countries get **poorer** and their **GDP per head goes down**, their citizens are **less able** to spend as much and they will choose, **rationally**, to spend less on health and safety. But they will live **shorter lives**.

We called this curve, which we derived in 2017 research, the **Bristol curve**.

(And the J-value predicts the Preston curve as well!)



- **Lockdowns** reduce GDP/head and so must **reduce life expectancy**.
- The **Bristol Curve** tells us **by how much** any fall in GDP/head will reduce life expectancy.
- The **Kermack-McKendrick** dynamic, epidemic model of 1927 (just 2 nonlinear differential equations: nothing gained from further complication) was used to assess the **amount of life expectancy to be gained** by the **most effective countermeasure** – a **long lockdown** followed by **immediate vaccination** effective enough to **stamp Covid out**.
- **BUT** if the countermeasures caused a **greater fall in life expectancy**, then they would cause **more harm than good**.
- I concluded in March 2020 that if the countermeasures led to a prolonged **fall in GDP per head of 6.4%** or more then they would have caused **more harm than good**.



THE TIMES
friday june 9 2023



Keeping the economy going is crucial because there is a link between GDP and life expectancy
SAM MELLISH/ALAMY

CORONAVIRUS

Economic crash could cost more life than coronavirus, says expert

Tom Whipple, Science Editor
Tuesday March 24 2020, 5.00pm, The Times

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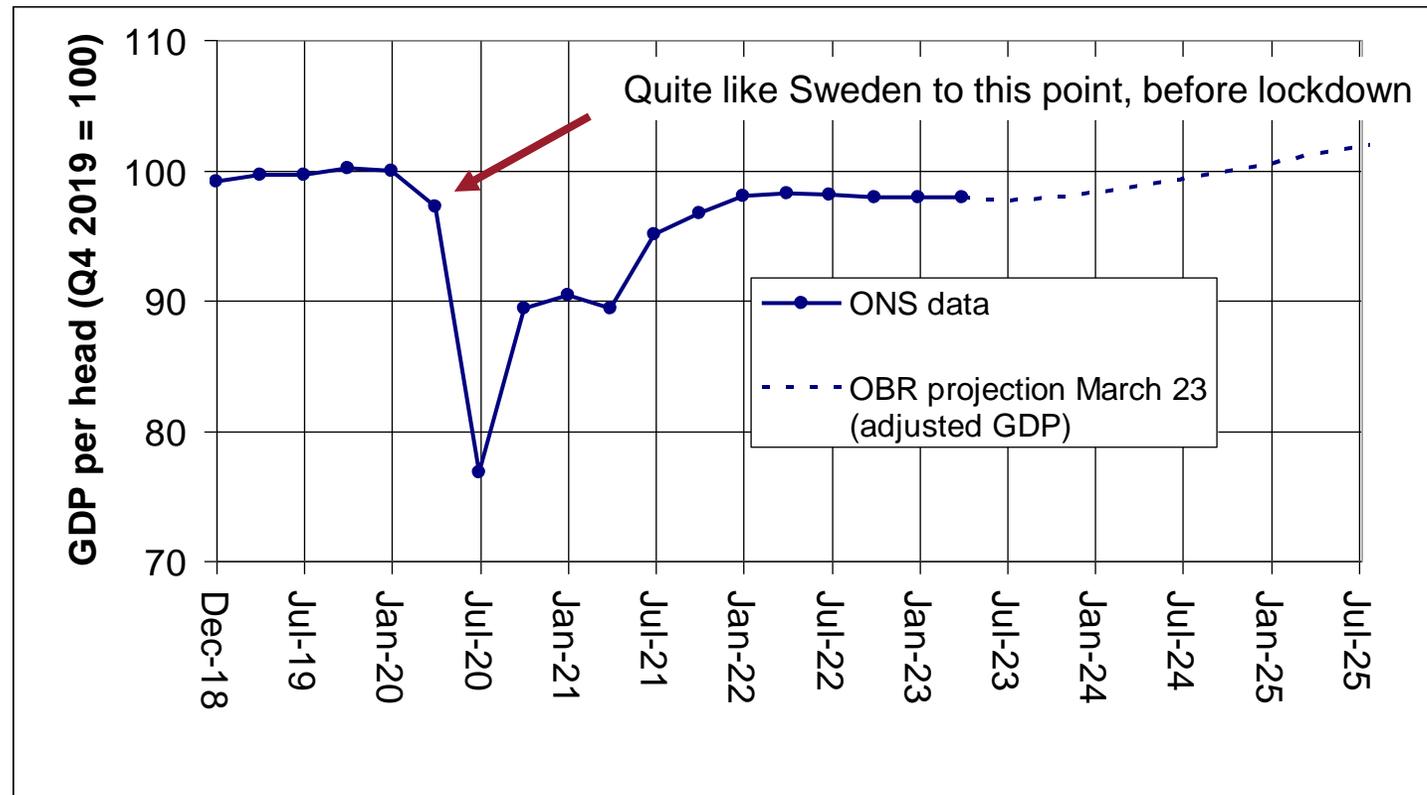
If the coronavirus lockdown leads to a fall in GDP of more than 6.4 per cent more years of life will be lost due to recession than will be gained through beating the virus, a study suggests.

Philip Thomas, professor of risk management at Bristol University, said that keeping the economy going in the next year was crucial, otherwise the measures would “do more harm than good”.

Report carried by
The Times on 24
March 2020, the
day after the first
lockdown started

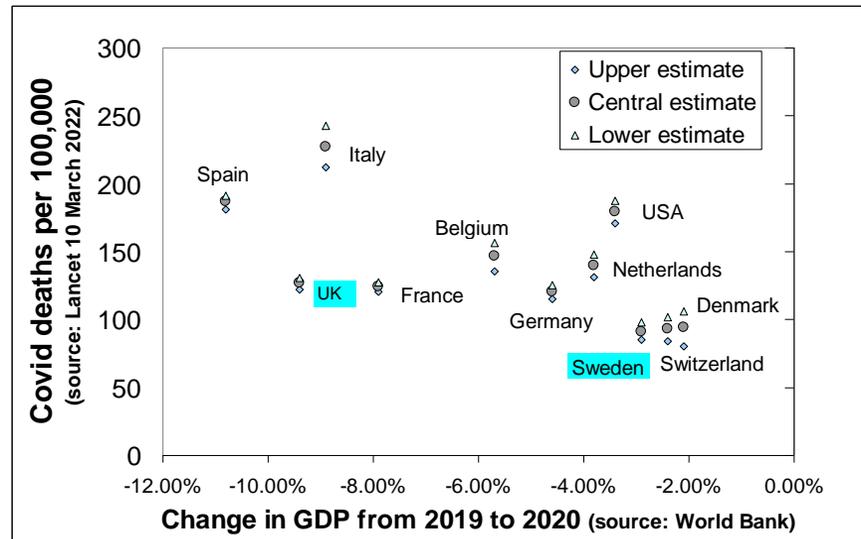


What actually happened to GDP per head?





How did the UK compare with other countries?



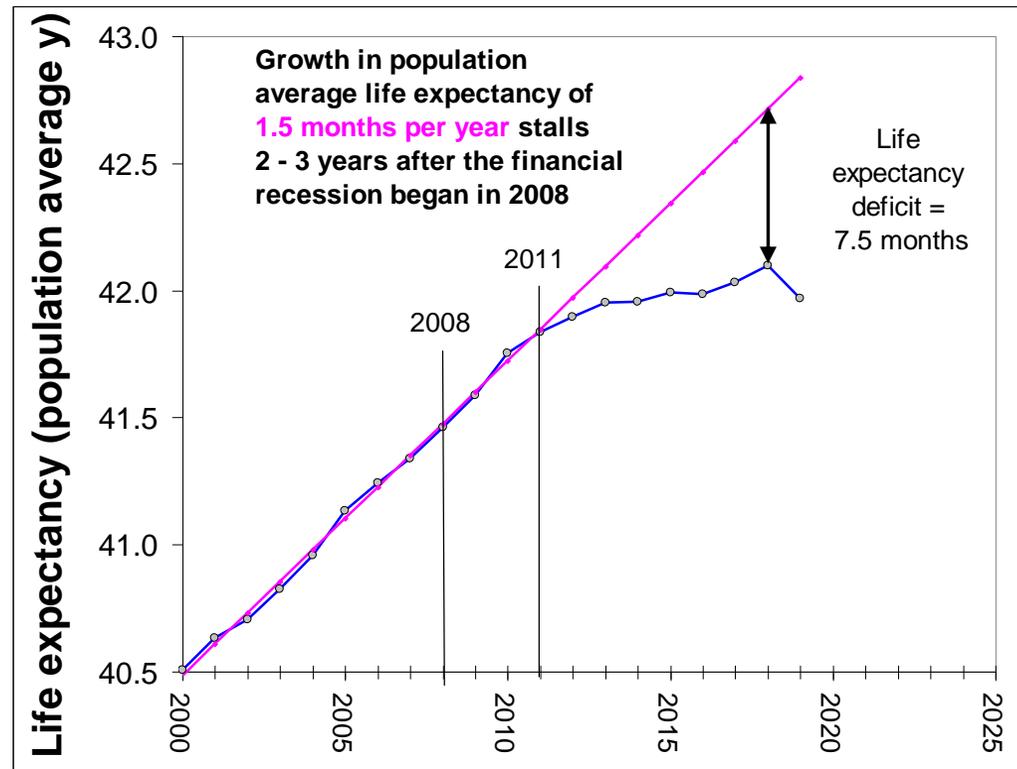
- **Sweden** maintained a generally **lighter touch** on restrictions yet had **fewer deaths** per 100,000 than the UK, **91** compared with **127**.
- Its economy suffered much less, falling only **2.9%** from 2019 to 2020, as compared with the UK's drop of **9.4%**.
- The **UK** seemed to be **heading the way of Sweden** in the first 3 months of 2020, with its GDP per head falling by **2.7%** in the first quarter, before the government adopted its lockdown policy on **23 March 2020**.



Calculating the net effect on UK lives of the government's Covid lockdowns using the financial crash of 2008 as a guide



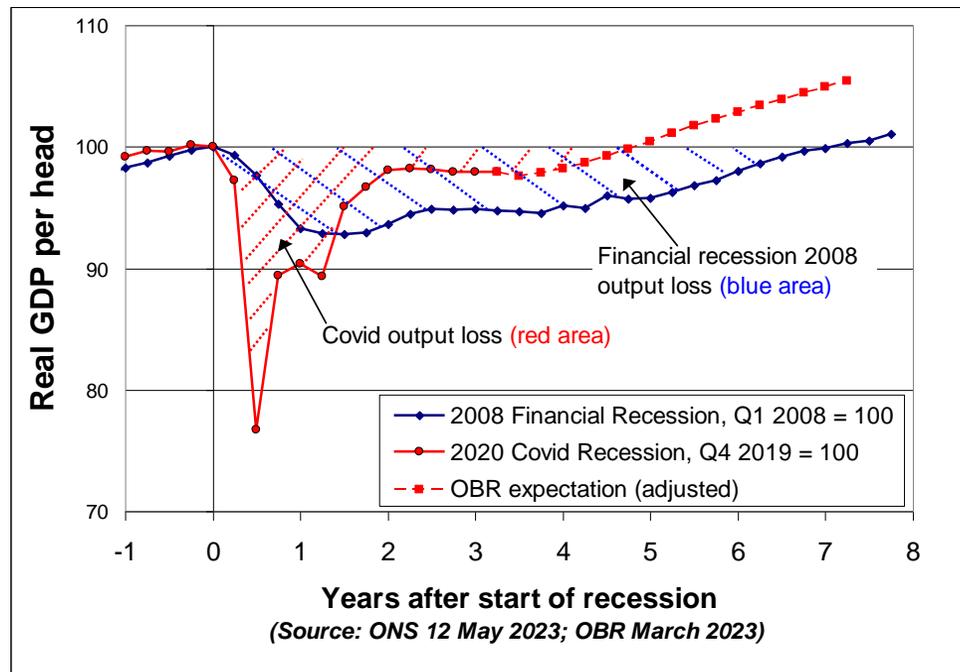
Life expectancy flat-lining after the 2008 financial recession



**UK
population-
average life
expectancy
since 2000**



Loss of life expectancy caused by Covid recession



The **Covid recession** is much deeper, but **may** be shorter

The Covid integrated output loss is about $\frac{3}{4}$ of the loss, **7.5 months**, from the **2008 Financial Recession**. The life expectancy deficit will be **5.4 months** for the **Covid recession**

Everyone loses **~ 5 months**, on average, and since there are **67 million** of us, this means the total life lost is **30 million life years** due to Covid's **economic recession**.



Countermeasures balance sheet

- The average UK citizen has 42 years of life expectancy, so the **cost of the Covid recession in average lives** is **30 million life years** divided by **42** years, which is **720,000 average lives** (*each lasting 42 years from now*).

How much life was saved by all the countermeasures?

- Assume **510,000 deaths** would have happened if **no countermeasures at all** had been implemented (**by government or people**) - Imperial College figure.
- **227,000 deaths recorded** within 28 days of positive test, to 8 June 2023.
- Average life expectancy of victim at death = 7.5 years
- Life saved by all countermeasures = $(510,000 - 227,000) \times 7.5 = \mathbf{2.1 \text{ million life years}}$, or **50,000 average lives**.
- **Net COST to the nation of all countermeasures: 670,000 average lives.**
- **The damage** to the nation, caused predominantly by anti-Covid lockdowns, has been comparable to **a major war**.



Conclusions

- The **harmful effects of lockdowns** will be seen for years to **come** in the UK's **flat-lining** or **falling life expectancy**.
- Those countries whose **GDP fell least** have **called it best: Denmark, Switzerland, Sweden** and probably the **USA**, despite its relatively high Covid deaths.
- The UK did badly.
- We ought to learn from the **Swedish experience** on how to implement **light-touch restrictions** to prepare us for a **future pandemic** of a new disease with similar properties and levels of harm.



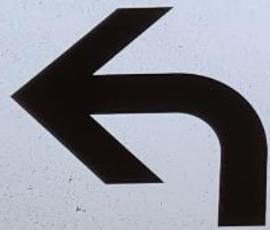
Comments, Questions & Answers



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Forthcoming Events

- Mon, 10 July (11:00-11:45) Convenient Untruths: The False Narrative That Offshore Finance Is A Cause Of Widening Inequality In The UK
- Wed, 19 July (11:00-11:45) Strategy in Action: How To Own, Develop & Execute Your Strategy
- Tue, 25 July (11:00-11:45) Pretence: Why the UK Needs A Written Constitution

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