The background features a stylized volcano in the lower-left quadrant, emitting a plume of white smoke. The volcano is rendered in shades of red and white. Scattered throughout the scene are several blue molecular models, each consisting of a central sphere connected to smaller spheres by thin lines. The background is a mix of soft, overlapping washes of light pink, red, and white, creating a layered, ethereal effect.

**Short
Supply**

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Director's Welcome

One would think that by setting the theme of *Disasters*, I was bound to be flooded with submissions ruminating on an impending apocalypse and dystopian futures. Given the challenging external circumstances everyone has suddenly found themselves in, it would not have been surprising had this edition been filled with heartfelt meditations on the struggles of 2020. But something quite different happened.

I found myself reading through thoughtful analysis of potential solutions to the problems of today. Writers chose to see disasters as opportunities to learn something. They posed crises as chances for systematic change that would not otherwise occur.

It filled me with a lot of brightness and hope to see that others of my generation have so much optimism for the future and the drive to focus their energies on developing new ideas and solutions. It inspires me to do the same and I hope that this publication sparks some light for you too.

So welcome to the 2020 Edition of Short Supply.

Thank-you so much for taking the time to read this in such a turbulent year. We put a lot of effort in and truly appreciate the support of each and every reader. Thank-you to everyone on the ESSA committee, all the writers, and our sponsors for enabling us to put out this publication.

Thao-Mi Bui
Director of Publications (ESSA Monash Clayton)

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How do we account for the intangible costs of floods?

Daniel Hill

Governments and the community can take action to minimise the impacts of floods, but how do you work out the best use of resources when impacts cannot easily be measured?

In 2010-11, floods impacted much of Queensland, resulting in over \$2 billion in direct property damage, 33 deaths and the evacuation of over 200,000 people. Floods will be an ongoing risk for much of Australia, with climate change and urban development expected to make risk of flooding events more frequent and severe. Governments and the community can take action to minimise the impacts of floods, but how do you work out the best use of resources? Below we look at costs of mitigating flood impacts, and the problems in measuring these costs.

How are flood mitigation options assessed?

Flood mitigation investments are designed to reduce the likelihood or impact of flood events. These investments may include levees, dams, land use controls and relocation from high risk areas.

Broadly, the objective of these investments is to minimise future costs of floods, including the costs associated with the flood mitigation. This most efficient investment occurs when the marginal costs of flood mitigation equal the expected marginal costs of future floods.

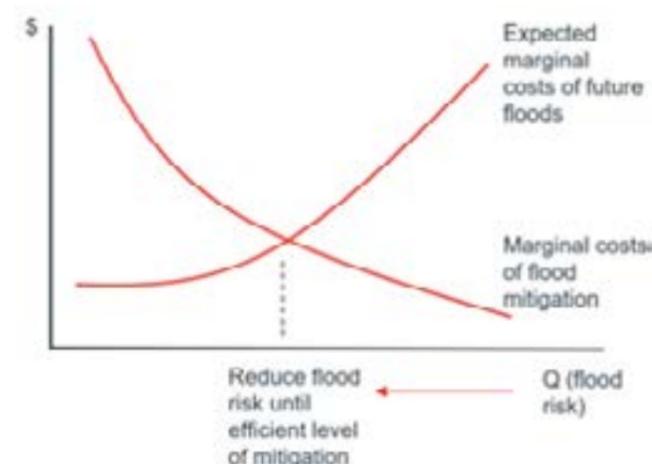
To determine this, the costs associated with flood events need to be understood. This includes direct costs such as infrastructure and property damage, indirect costs such as traffic disruption and intangible economic, social and environmental costs (costs that are difficult to monetise).

In practice it can be difficult to determine this efficient level of flood mitigation because:

- **The likelihood and extent of future floods is uncertain.** The modelling of floodplains, climatic information and assumptions on future land use can inform a range of potential flood scenarios and likelihoods to develop an expected value to then assess flood mitigation investments
- **There are significant intangible costs that are difficult to monetise.** Not considering these costs can result in underinvestment in mitigation works.

For the remainder of this article we focus on these intangible costs. In particular, how they have been considered to date in flooding options assessments, why it is important that they are considered and how this should be done.

[Figure 1]: Efficient level of flood mitigation



Source: Frontier Economics

What costs are usually considered?

Intangible impacts of flooding are difficult to estimate and monetise. These may include stress, injury and loss of life, environmental damage, loss of culture and heritage, community impacts, and indirect employment and education impacts. Intangible impacts can be estimated by either:

- estimating the resources costs associated with some potential impacts (e.g. health system costs for mental illness deriving from flooding events); or
- estimating willingness to pay amongst community members to avoid consequences from flooding, either through survey methods (stated preference) or by observing willingness to pay in other scenarios that may mirror that in a flooding event (revealed preference).

However, there are limitations to these methods.

- Not all intangible costs have data on associated resource costs
- Revealed preference relies on data in relation to past events which are typically not available for rare, high impact events.
- Stated preferences are hypothetical and require individuals to respond to events they may not be familiar with. For example, it is difficult for a respondent to state their true willingness to pay when the likelihood and costs of potential floods are difficult to comprehend without past experiences of flooding. In addition, how the survey is framed can lead to significant variation in the willingness to pay, especially for uncertain, high impact events such as floods.

This can make valuation of intangible benefits difficult, controversial and costly to achieve. However, not considering these intangible impacts, could result in a significant underinvestment in flood mitigation.

What other options do we have for measuring intangible costs?

Instead of estimating context specific intangible costs for flooding events, flood management plans have recently adopted multipliers to approximate the magnitude of intangible costs. For example, the Brisbane River Strategic Floodplain Management Plan estimates the intangible costs as a ratio of the measured tangible costs. This relationship between tangible and intangible costs is based on studies on the 2011 Queensland floods, the 2009 Victorian bushfires and other flooding events in Northern Territory. For smaller, more frequent floods an additional 12% is added to the total cost to account for non-monetised intangible costs, whereas for larger floods an additional 117% is added to the costs.

When taking the weighted average across all potential floods considered in the Brisbane River plan, the average annual damage due to intangible costs of floods is estimated to be \$102 million. This is a significant cost which has notable implications for flood mitigation strategies in the Brisbane River floodplain.

Whilst simple and practical to implement, the methodology comes with significant limitations. In particular, the relationship between tangible and intangible costs will likely not be applicable to all floods in all areas. For example, the relationships for the floods were determined based on small sample of ex post studies of floods, and in some cases other natural disasters, and may not be representative for all floods.

In addition, intangible costs rely on there being proportional direct and measurable costs. In regional areas direct costs from floods on property and infrastructure may be relatively low, but this may not reflect the intangible costs to regional

communities or the environment.

Can we use minimum standards instead?

Another more commonly applied option is to set a minimum containment requirement for flood mitigation investments. These typically require responsible agencies to make investments to avoid the risks of floods up to a certain annual exceedance probability. For example, a flood levee may need to be built to prevent floodwaters exceeding it more than once every 100 years.

Minimum standards should ideally be set to drive the efficient level of flood mitigation investment. However, in practice it is difficult to do this without an understanding of the expected marginal costs of future floods. In most cases it is unclear on what basis these safety standards were developed given they were defined so long ago. With this said, minimum contained standards are easy to communicate and may be less controversial to implement. This is particularly important for flood investments where excess risk of injury and loss of life can be unacceptable.

What learnings can we take from this?

Determining the efficient level of flood mitigation requires a strong understanding of all potential costs from a flooding event. Intangible costs, such as mental health impacts, are likely to be significant for events such as floods where the risks of loss of life, injury and ongoing mental health issues is high. Ignoring these intangible impacts, could result in significant underinvestment in flood mitigation.

However, estimating intangible costs is difficult, controversial and costly. Commonly applied shortcuts for accounting for intangible costs include applying a multiplier to known tangible costs to approximate these or setting minimum containment standards. These approaches are steps in the right direction, but will not necessarily achieve efficient flood mitigation investment.

There is scope to better refine our understanding of intangible costs from flooding events, especially in high risk areas where major mitigation investment is required. Economics can keep pushing the frontier on validating and estimating costs that are difficult to quantify. These learnings are applicable in other contexts where investments can reduce the risk of high-impact events – such as bushfires, biosecurity risks, storms and drought.

Daniel is an economist at Frontier Economics.

Reset not restart: taking advantage of a crisis for social change

Kate Palmer

What positive impacts has COVID-19 had on Australians and how can we ensure these continue?

In the short term, responding to COVID-19 has required governments to prioritise managing the health crisis and responding to the economic fallout.

Societies have grappled with different approaches, with varying degrees of success. Though success does not just sit in the hands of government – the actions of communities, our culture and businesses shape the nation's trajectory. While some nations have adopted effective tracing using surveillance techniques such as facial recognition or CCTV footage, this use of surveillance may be less welcome in other nations. Similarly, the social fabric and understanding of one's individual role in contributing to a community response influences the success of our public health response.

In Australia, the focus has appropriately been on the public health response and cushioning the economic impact. The decisions associated with the economic and health impacts have flow-on effects to our society. To date we have observed negative changes in our broader social indicators, including rates of domestic and family violence, mental health, child protection, and justice system.

Yet it is not all bad news. We have witnessed social connectedness on a global scale, and innovation and adoption of new technologies at an unprecedented rate. The use of new technologies is also changing the way we deliver social services. We have seen restaurants and the arts sector change their business models, new apps to connect those who need support with volunteers, and messages of hope that create community connections. We need to understand, monitor and document these affects – positive and negative – to ensure our immediate and long-term policy responses account of these changes, take advantage of the positive aspects, and provide an effective mechanism to address the social impacts of COVID-19.

“ The economic challenges of COVID-19 are deep and broad, but we have the opportunity to use these challenges to fast-track positive investments that will ultimately delive better social outcomes. ”

The economic challenges of COVID-19 are deep and broad, but we have the opportunity to use these challenges to fast-track positive investments that will ultimately deliver better social outcomes. That way, when we do get to the other side of the proverbial bridge, we can be confident that, not only did we successfully address the social impacts, but we took advantage of the impetus to change the way we delivery social services across our nation. And maybe this will change our collective understanding of how we, as individuals and society, contribute to building a better future.

A framework for social impacts

Australia's public health response to rapidly contain the virus has, thus far, proven to be crucial in preventing widespread infection, death, and an overburdened health system. This 'lockdown' style response, involving strict social distancing, working from home, and closing of business operations, has shown to be effective in curbing the spread of COVID-19. While necessary, these responses have led to a range of social impacts.

The range of policy responses that were implemented can have flow-on effects that impact on other areas of our lives. These can be positive, such as the uptake in innovative technology in order to remain connected, but can also lead to devastating impacts, such as an increase in family violence. Take for example the corporate world: office-based businesses were quick to take the lead on encouraging their employees to work from home to promote social distancing – a worthy pursuit. But in making this decision to mitigate the spread of COVID-19, there can be significant adverse effects on employees with unsafe home environments. In many cases, these social impacts can also disproportionately increase inequality, by having a greater effect on already disadvantaged or lower socio-economic groups in the community.

So, if we are to plan how we leverage the positive social impacts that have occurred, while continuing to mitigate against the negative impacts, we need to understand what the impacts are likely to be. As the crisis abates, but the social impacts continue to be felt, ongoing consideration of health and social care reforms is key to ensure support for Australians is maintained.

The social impacts operate in a framework of policy responses and funding decisions, which are underpinned by the public health response.

A case study of sector impact: domestic and family violence

The need to socially isolate has meant victims of domestic and family violence could be at greater risk in their homes. As unemployment and financial stress of households increase, the risk of domestic and family violence rises. There have been anecdotal reports of perpetrators using the pandemic to increase their control over victims, and statistics also suggest that there has been an increase in domestic and family violence. A recent study undertaken by Monash University surveyed 166 family violence practitioners across Victoria during a four-week period from April to May. Fifty-nine per cent indicated that the frequency of violence against women had increased, and over half said that the violence was more severe.¹

A survey of 15,000 women undertaken by the Australian Institute of Criminology, released in July, found that almost one in ten women in a relationship experienced sexual or physical violence between March - May 2020. For a third of these women, this was the first time they had experienced domestic violence in their relationship.²

Queensland's emergency departments have seen an increase in trauma caused by domestic and family violence,³ and government's Victims Services program in NSW has seen a ten per cent increase in urgent assistance being sought.⁴ Online searches about domestic violence have increased by 75 per cent compared to the average volume

over a 5-year period. Some agencies have experienced an increase in helpline calls, including 1800 RESPECT which has seen call volume increase by eleven per cent.⁵

An activist working for the Women Support Services South Australia has found that while calls for help have decreased, she has received an increase in text messages and emails, which suggests that victims are avoiding phone hotlines where they could be overheard by the perpetrator.⁶

Similarly, use of online domestic and family violence reporting has spiked; for example, 1800 RESPECT has recorded a 38 per cent increase of its online chat tool between March and April.⁷ Demand for support services are expected to increase following restrictions easing as those living in unsafe environments have the opportunity to move more freely.⁸ For victims, Western Australia has responded to COVID-19 by amending legislation. Among other reforms courts can now impose electronic monitoring of offenders and applications are able to be made online.⁹

Queensland has responded to COVID-19 through provision of an additional \$5.5 million in funding for domestic and family violence services. The funding has been delivered to boost capacity of 24/7 crisis centres and enable online support, create additional capacity in crisis shelters by transitioning women to alternative accommodation, funding for specialist support services and a new awareness campaign.¹⁰

In early May, Victoria also took steps to respond to greater risk and incidences of domestic and family violence during the pandemic. The state has launched a Respect Each Other: 'Call it Out' media campaign to help educate communities about domestic violence and the need for individuals to report any violence they observe Victoria's Government has also invested \$40.2 million dollars to help crisis accommodation and family violence services meet the expected increased demand for their services during the pandemic.

Despite the barriers to delivery of support services, which typically rely on face-to-face contact, social services have been able to adapt. These adaptations may serve as

1 Monash University, Responding to the 'Shadow Pandemic': Practitioner views on the nature of and responses to violence against women in Victoria, Australia during the COVID-19 restrictions. https://bridges.monash.edu/articles/Responding_to_the_shadow_pandemic_practitioner_views_on_the_nature_of_and_responses_to_violence_against_women_in_Victoria_Australia_during_the_COVID-19_restrictions/12433517

2 Australian Institute of Criminology (2020). The prevalence of domestic violence among women during the COVID-19 pandemic, <https://www.aic.gov.au/publications/sb/sb28>

3 ABC News, Coronavirus isolation prompts rise in domestic violence trauma cases in Queensland emergency departments, Health Minister warns, May 2020. <https://www.abc.net.au/news/2020-05-06/coronavirus-queensland-prompts-increase-in-domestic-violence/12218692>

4 The Sydney Morning Herald, Domestic violence victims seeking help rises 10 per cent after COVID-19 lockdown, May 2020. <https://www.smh.com.au/national/nsw/domestic-violence-victims-seeking-help-rises-10-per-cent-after-covid-19-lockdown-20200501-p540xt.html>

5 ABC News, Amid coronavirus lockdowns, use of online domestic violence reporting tool spikes, May 2020. <https://www.abc.net.au/news/2020-05-01/domestic-violence-brace-for-demand-coronavirus-restrictions/12203178>

6 SBS Punjabi, Coronavirus lockdown: Domestic violence complaints in Australia rise even as reports by phone fall, April 2020. <https://www.sbs.com.au/language/english/audio/coronavirus-lockdown-domestic-violence-complaints-in-australia-rise-even-as-reports-by-phone-fall>

7 ABC News, Amid coronavirus lockdowns, use of online domestic violence reporting tool spikes, May 2020. <https://www.abc.net.au/news/2020-05-23/coronavirus-lockdown-domestic-violence-spikes-in-australia/12238962>

8 ABC News, Domestic violence services prepare for demand as coronavirus restrictions begin to ease, May 2020. <https://www.abc.net.au/news/2020-05-01/domestic-violence-brace-for-demand-coronavirus-restrictions/12203178>

9 Government of Western Australia, Media statements: New laws to protect family violence during the COVID-19 pandemic, April 2020. <https://www.media-statements.wa.gov.au/Pages/McGowan/2020/04/New-laws-to-protect-family-violence-victims-during-COVID-19-pandemic.aspx>

10 Queensland Government, Media Statements: \$5.5m to boost domestic violence services during COVID-19 pandemic, April 2020. <http://statements.qld.gov.au/Statement/2020/4/8/55m-to-boost-domestic-violence-services-during-covid19-pandemi>

promising steps towards evolving service delivery in future. As victims of family violence are less visible due to isolation, retaining access to those at risk through virtual communication remains imperative.

Where to from here?

As the Federal and State Governments continue planning the economic recovery and relaxing social distancing measures, we have an unprecedented opportunity to harness the positive effects of COVID-19 and curb the long-term negative effects.

This requires two things:

1. Businesses, community and government to work together. Harnessing each other's knowledge and expertise, and supporting each other in the way that is most effective.
2. Targeted decision making that leverages the positive impacts to ensure they continue, so that the economy and society will thrive.

We have choices to make regarding what we want to value, and how we shape our future as we emerge from this

pandemic. We know there will be debate and disagreement around what we can afford, and what should be prioritised.

These are bold choices. We have the opportunity to boost productivity, while driving positive social impacts though addressing inequalities. This means investing in social infrastructure and backing new and innovative operating and delivery models that have worked during this time.

Our hope is that from this crisis a new path for Australia emerges.

One where the collective is prioritised, where those less off are thought of first, let's Reset not Restart.

Kate works at Deloitte Access Economics.

This article is taken from Deloitte Access Economics' report on the social impacts of COVID-19, which can be found online [here](#).

Catastrophe modelling

Sao Yang Hew

How do we measure the damage that earthquakes, tsunamis and disasters cause? It's complicated, but we need these models more so now than ever.

To start this discussion, I'd like you to do that thing you've never done before... actually look at the footnotes. Yes, please briefly flip through footnotes of the other articles within this publication and pay closer attention to references that are related to statistical analyses and expert opinion.

Now, the question of interest is, how do these statistical pointers come about? Analyses on disaster-related data are often performed on a large scale by inter-disciplinary experts (usually a combination of statisticians, actuaries, climate scientists, epidemiologists, etc.). These data analysis pursuits would usually be categorised under catastrophe modelling frameworks (our topic of the day!), which are processes that utilise computer-assisted simulations to quantify the impact of certain disasters, and more importantly estimate incurred operational and financial losses.¹

Within this article, we will explore societal needs for increasingly sophisticated catastrophe models, how they usually work to estimate different financial or structural losses, major players within catastrophe modelling and how they have affected the current standing of catastrophe models. We will also briefly look at modelling outputs that are of applicable use, and ask ourselves why exactly is it so challenging to translate modelling results into policy measures,

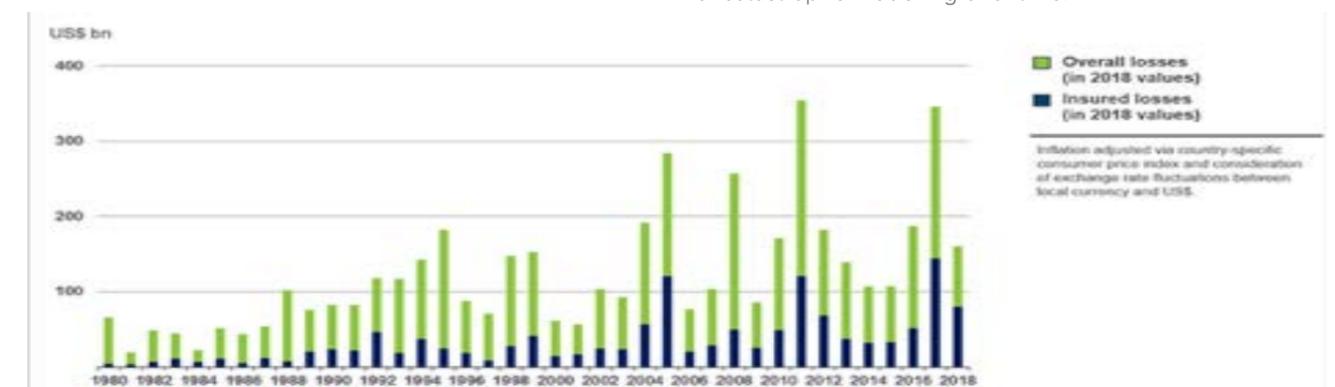
and how we should accommodate for pitfalls moving forward.

Why do we need catastrophe models?

The need for reliable inference of disasters requires little to no contextual elaboration. Clearly, the articles within this publication are supported by sophisticated statistical reasoning. Why would you trust them otherwise? And other than being sources of information, catastrophe modelling fulfils a variety of needs and applications.

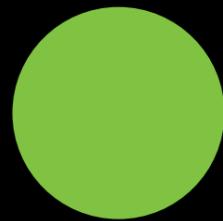
In particular, actuaries use catastrophe modelling frameworks to estimate risk and losses associated with major catastrophic events and thus determine who might require payouts from insurance companies. One would commonly see active catastrophe modelers in reinsurance companies including Swiss or Munich Re. In other words, these are insurance companies that cover for insurance companies (insurereception) when they are unable to pay for all claims within a certain period. This usually arises when systematic (as opposed to idiosyncratic outlier events) large-scale events occur, such as the recent Australian bushfires or even COVID-19 (a major catastrophe to my social life).

Shown below is a graph that details the relative importance of catastrophe modelling over time:²



Source: © 2019 Munich Re, Geo Risks Research, NatCatSERVICE. As of March 2019.

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¹ Leer, K. V. (2015, June 22). What is Catastrophe Modeling? Retrieved from <https://www.rms.com/blog/2015/06/22/what-is-catastrophe-modeling>

The plot shows the relationship, and difference between insured losses and total estimated losses in USD as a result of recent global catastrophes in US\$ billion against time. With this, we can see that while losses are increasingly insured in recent years, the rate of growth of total losses (and hence also the difference between insured and uninsured losses) has been growing at a higher rate. This is not to say that catastrophes are more damaging in recent times than before. As nations develop, we simply have more expensive items like buildings that could potentially be damaged. The need for catastrophe insurance, and hence sophisticated techniques to indicate the amount required to be insured is obvious.

What do catastrophe models look like?

Catastrophe models, as compared to other models used within the economics and financial realm, are distinctive in their complexity and requirement for interdisciplinary input to work well. Consequently, they are relatively underdeveloped, especially in developing countries that do not have access to resources and proprietary catastrophe modelling services. Since most methods of risk assessment in finance and economics lack the scale of catastrophe models, only actuarial models used in larger areas of insurance, such as life and general insurance, are remotely comparable. However, the approach even in these would make for very bad catastrophe models.

For example, actuarial models used primarily for pricing and reserving rely on inputs that are frequent and arise from events of low severity (e.g. car damages or medical claims). This paves a forgiving atmosphere for modelers where data is abundant, diverse, and where individual data points usually have miniscule effects on model output. For most actuarial models, we can also reasonably assume that past patterns in claims or damages will persist in the future, or follow certain fundamental trends.

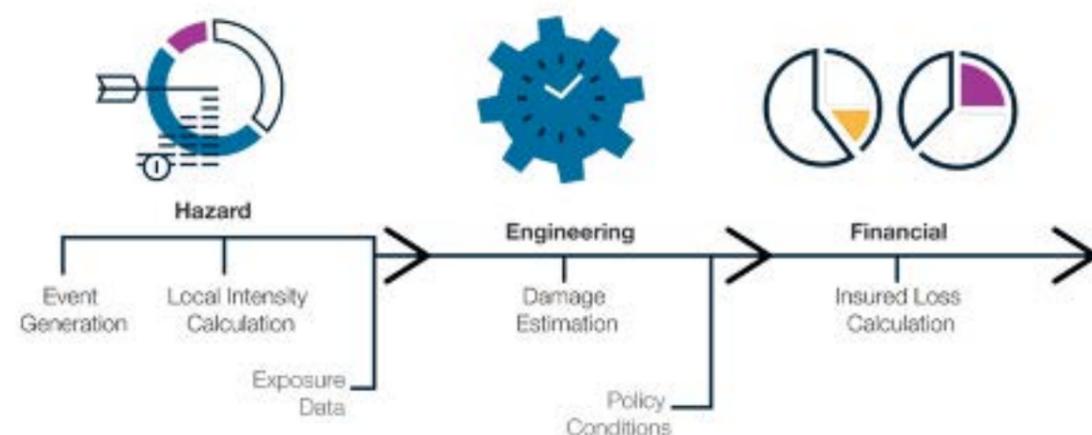
It hardly makes sense to apply the same approach to catastrophe models, as catastrophes are comparatively rare and idiosyncratic. The extent of damage within catastrophes usually compounds in unpredictable ways. Some examples of this would include the earthquake in Fukushima which resulted in severe damages toward nuclear reactors, and so on. This would result in large-scale insurance claims that have the potential to shake insurance companies (literally and metaphorically). Models for catastrophes are usually independent of previous disasters. This is because unlike conventional insurance data, an earthquake last year is not an good indication of an earthquake in 10 years.

Who builds catastrophe models?

The process of defining and applying techniques to catastrophe models are secondary issues to who should be responsible for each life-stage of a model. With different specialists required at different stages of the modeling workflow, faulty modelling arises with imperfect synergy between those responsible for piecing the model together. This risk more pronounced in catastrophe modelling compared to many other smaller scale modelling pursuits.

But first, take a look at [Figure 1] below summarising the 4 universal stages in catastrophe model workflows.¹

In the first and second stage, a deep understanding of certain catastrophes at hand is required and thus this is usually handled by climate scientists and other researchers specific to this field. In this phase, they usually define the scope of the event at hand (e.g. the type of disaster and possible scale of the disaster), and assess the type of hazards that may affect the scale of the disaster. After this stage, experts of the built environment would be brought in to assess the likelihood and extreme extent of damage on human property (those that, of course, require insurance claims). Engineers would then need to identify the scale of damage in detail, and where possible, provide recommendations to materially



[Figure 1] Components of an AIR catastrophe model

1 Fullam, D. (2020, July 20). How Catastrophe Modeling and Mortality Modeling Differ. Retrieved from <https://www.air-worldwide.com/blog/posts/2020/7/how-catastrophe-modeling-and-mortality-modeling-differ/>

shield the built environment from anticipated damage.

Where do we use catastrophe modelling outputs?

This information, alongside insurance claims incurred, would then be refined and systematically categorised by analysts or actuaries to be reported in a format digestible by the civil service, insurance companies and to some extent the general public. These will inform adaptations such as policy amendments, proposals and changes in lifestyle to mitigate potential losses from natural disasters.

But what form do these modelling outputs take, and how are they usually interpreted and applied in the context of disasters? To answer this, we revert to the fundamental question of what our objectives are. The straightforward answer to this, is to predict the amount of losses incurred by disasters. These translate into quantifiable and interpretable metrics, namely the Average Annual Loss (AAL), exceedance probability (EP) and tail Value-at-Risk (TVaR).¹ These terms hopefully ring some bells for those with exposure to risk management procedures. Essentially, these distilled but important quantities are comparable values by which risk is priced, transferred and traded, as they show us the depth of losses we can expect and what the loss distributions look like. In other words, we can make probabilistic statements about the loss we expect.

In a nutshell, catastrophe models help us measure loss in terms of these more interpretable metrics. In doing this, they help us answer questions like: What is the fair price an insurance/reinsurance company should charge against losses arising from devastating disasters? How and in which sector should the government allocate funding to ensure healthy recovery of the economy as a whole, and the welfare of the people? Who should be liable for such losses? How would risk-sharing work in a nation if one large sector is significantly and systematically affected?

How has the catastrophe modelling industry evolved?

Scientists, engineers and finance/insurance professionals have convened since the late 20th century to develop and refine the mathematical models answering these critical questions. They've come a long way since, with models now incorporating a wide variety of possible catastrophes and being supported by more sophisticated, cutting-edge statistical methods.

But where did this all start and who are the industry leaders now? To understand where this all started, one would need to mention the pioneering team of Risk Management Software (RMS) Inc., founded by Stanford academics Hemant Shah and Weimin Dong; and AIR Worldwide, founded in Boston

by Karen Clark. RMS and AIR Worldwide arguably kickstarted the formal and extensive use of catastrophe risk modelling frameworks through their software. Since, they have continued to provide breakthroughs in catastrophe modelling by congregating researchers of different fields; and pioneering and improving new models for disasters, such as hurricanes, terrorism risk amid the 9/11 attacks, disasters induced by climate change and many more.

To date, RMS and AIR Worldwide remain the largest companies that provide proprietary services to insurance, reinsurance and other companies internationally, and have opened branches in major developed countries such as the US (where they originate), the UK, Japan, China and Singapore. This leads to imbalances whereby some areas are more likely to obtain support from catastrophe risk modelers than others. Catastrophe modelling in developed countries has had ample funding and operational support. This is not the case in developing countries, which bear the brunt of compromised modelling practices. The fact that RMS and AIR Worldwide are proprietary client service firms make this inequality unsurprising.^{2,3}

The alternative is to rely on open-source development of models, which, to date, have been dominated by the Oasis Loss Modelling Framework. Managed and developed by the Oasis team, the platform was founded with those who do not have adequate access to catastrophe modelling resources in mind, such as insurers in developing countries.⁴ The team have made significant contributions such as general models and guides for developers that are free-for-use by all, and can be found on their github repository here (<https://oasislmf.github.io/>).

There are, of course, numerous organisational initiatives that are similar to RMS, AIR and Oasis. However, equally important in developing the industry as catastrophe modelling teams are those who utilise and make decisions based on modelling results. Insurance and reinsurance companies, and governments have provided funding and expertise to improve the field to their benefit. In turn, these are driven by professionals that dominate these industries - actuaries. Catastrophe modelling conferences are usually headed by actuarial professional bodies such as the Society of Actuaries or the Actuaries Institute of Australia, with many actuaries venturing into catastrophe modelling as well.⁵

Navigating the minefield of translating modelling results into policy

Whilst the discussion thus far paints a picture of a well-established and mature industry, translating modelling results into successful policies remains a primary concern. Most of the issues stem from ineffective communication of modelling

1 AIR Worldwide, (n.d.). About catastrophe modelling. <https://www.air-worldwide.com/Models/About-Catastrophe-Modeling/>

2 RMS. (2020). When uncertainty is constant, be prepared. <https://www.rms.com/>

3 AIR Worldwide. (2020). Catastrophe Modeling and Risk Assessment. <https://www.air-worldwide.com/>

4 Oasis. (2020). Oasis Loss Modelling Framework. <https://oasislmf.org/>

5 Actuaries Institute Australia. (2015, July). The use of catastrophe modelling results by actuaries. https://www.actuaries.asn.au/Library/Standards/GeneralInsurance/2015/GIPC_CatModelling27072015.pdf



Photo by Max Chen on Unsplash

results and the incentives for different roles within public policy.

Take pandemics for example. There has been great interest in planning for influenza and coronavirus in the epidemiology community since the last century. Multiple smaller scale outbreaks have occurred within different communities as a result of SARS-Cov-1, H5N1, MERS, etc. Modelling pursuits were rampant when these outbreaks were happening (including this pandemic) that have pointed towards continuous research and development in developing and storing antivirals in the event of virulent and lethal outbreaks.

When the H1N1 pandemic eventually occurred, people came to realise that the virus itself was mild and in many cases did not need anything beyond the immune system to counter, though modelling results retrospectively point towards the fact that more than a billion people have been infected. Up-roads followed from the public criticising governments in investing large sums for continuous research and stockpiling of antivirals instead of the needs of the people, despite it being recommended by scientists as the best course of action for ultra rare, 'black swan' events. Eventually, governments that are in need of support and votes gradually steered away from research of this sort, as claims that viruses could wipe out the population are taken less seriously. Here we are, more than a decade later, scrambling and debating which measures should be taken to suppress a virus that has shut down entire economies. A pertinent question to ask at this point is – where would we be had we invested in this research earlier?'

The risk of rare, catastrophic events is perceived differently by the scientific community, catastrophe modelers and the general public, and each respond to highly uncertain outcomes under different incentives. But modelers and policymakers need to work hard to bridge the gap to ensure successful translation of modelling results into policy.

What's the future for catastrophe modelling?

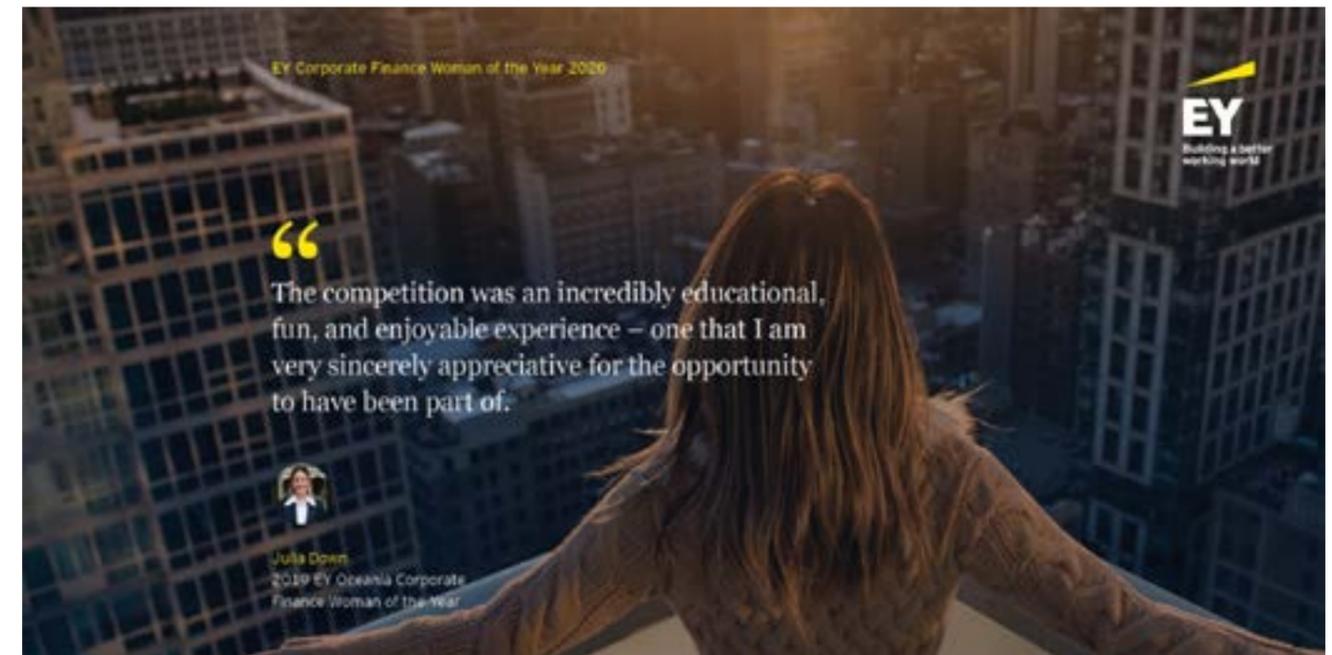
Evidently, there aren't a lot of criticisms of the active pursuit

and current state of catastrophe modelling. It has seen its impacts in the insurance and reinsurance industry since its boom in the 80s with the inception of companies dedicated to the craft, and is somewhat effective in shaping public policy to account for the most devastating of disasters. I would argue as a closing note that there are two main areas in which catastrophe modelling could improve, particularly in the face of an increasingly uncertain and unstable future, and that is in democratisation and integration.

Firstly, industries and countries which have no access to proprietary models would certainly benefit from open-source tools to model disasters. Efforts to democratise catastrophe modelling, such as that helmed primarily by the aforementioned Oasis LMF, should thus be encouraged and bolstered.

Lastly, ensuring that synergy between governments and researchers is maximised is vital. Identifying structural holes in communication between policymakers and modelers is critical. Bridging these will involve building an environment in which modelers clearly communicate how models can and should be used, and their limitations, while policymakers clearly communicate desired information required for effective policymaking. One-way silos in communication can be mitigated through proactive integration of modelers as policymakers and vice versa. This would reduce incentives to produce great (but unnecessarily complicated) models on the part of modelers; and minimise incentives to simplify and skew nuanced model results to justify politically desirable policies on the part of policymakers. Allowing modelers (especially those involved in highly technical aspects of modelling) to take important roles in policy can also help ensure modelling-assisted policies are rolled out to the community with higher effectiveness.

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Universal Basic Income: A radical idea enters the mainstream

Conor Yung

With the Federal Government spending \$130bn to keep the COVID-unemployed afloat, is it time to consider a more permanent wage scheme? Proponents of a Universal Basic Income (UBI) argue that being paid for sitting at home should become commonplace.

Universal Basic Income: Is now the time for radical ideas?

The allure of a Universal Basic Income (UBI) policy has grown amidst an increasingly volatile economic and political landscape. Some scholars are concerned that a 'robot apocalypse'¹ and automation will take many middle skilled jobs.^{2,3} Additionally, globalization has increased competition in the labor market, creating an increasingly casualised job market.⁴ The macroeconomic reality is driving concerns that an increasing class of people will have unstable incomes and that the current welfare program is inadequate in addressing this issue.^{5,6}

In light of this, the idea of a UBI has captivated political audiences as a potential solution. The idea was spearheaded in the Democratic Party nominations in America by Andrew Yang, who argued it could free people from the perils of insecure work, prevent burgeoning inequalities and reduce the stigma of government welfare.⁷ However, despite the ideas behind a UBI attracting significant support, the policy itself is commonly misunderstood.

What is UBI?

At the most basic level, UBI's literal definition seems clear. 'Universal' refers to a payment that is available to everyone, regardless of how much you are earning. 'Basic' refers to a payment that secures basic necessities and can also be supplemented by other income. Finally, 'income' refers to a payment that is strictly a cash benefit and not contingent on work.⁸ But the radical nature of UBI is only truly seen when contrasted with existing policies, and other alternative policies that have been proposed. Historically, the two generally unwavering pillars of welfare systems demand that you work, and earn a 'low' income to be eligible for welfare payments.

Most welfare systems around the world are phased out as income increases. America's largest cash transfer program to low income earners, the Earned Income Tax Credit (EITC), allows qualifying low income earners to offset their tax liabilities through tax credits. If the credits are greater than the liabilities, then the government will pay the difference, with a maximum possible payment of \$5,500.⁹ Unlike the EITC, where the payment grows smaller the more you earn and is only available to those who are working, a UBI is completely unconditional.

The radical nature of UBI is even more apparent when we consider the outcome of Nixon's proposal of the Negative Income Tax (NIT). Similarly to the EITC, it targeted those below an income cutoff. However, crucially, it was also available to the unemployed. Whilst the NIT is not materially different from conventional welfare policy in practice, its theoretical departure from the EITC was poorly received. Despite Nixon instituting five NIT trials from 1968-1982, payment to non-workers was highly controversial,¹⁰ resulting in the aforementioned Earned Income Tax Credit (EITC) policy, which the US retains today. The NIT was only half-way there to the UBI, removing the demand that you work to be eligible for payment but not that you earn below a certain income threshold, but was already spectacularly shot down in Parliament.

So what happens both theoretically and practically when we remove both of the two pillars, making welfare payments completely unconditional in the radical form of a UBI? Whilst the NIT has been widely misappropriated as a version of UBI, it is actually far less radical an idea than UBI when we examine their philosophical distinction.

The philosophical vision of UBI

Underlying the structure of NIT-based schemes is the modern liberal view that welfare policies are a vehicle to get people back into jobs, and to combat income inequalities. Accordingly, NIT-based schemes targeted to low income earners and phased out as income increases.

Like the NIT, reducing inequality remains one of the goals of UBI. However, its vision is even more transformative than that of an NIT. Proponents of UBI intend on increasing their citizen's freedom of life, rather than just their freedom to buy.¹ In light of their bleak views on automation, UBI proponents argue that the welfare system needs to adapt to allow its citizens the freedom not to work, rather than pressuring them to get back into work.^{2,3} In addition, a UBI would also allow its citizens to pursue their own careers, freed from financial constraints.

Since proponents of UBI embrace a more creative role for welfare policy, they consequently argue for universal and ongoing cash transfers, extending beyond the NIT's narrow view that payments go only towards those below a low income.

The intentions and vision of UBI are clearly beyond what previous schemes and proposals have imagined, but now we investigate whether implementations of UBI are able to achieve their bold intentions. Whilst a number of pilot programs have generated high confidence in UBI, we discuss how advocates have perhaps misplaced faith in programs which are far more limited than was thought.

Too hard on the government purse?

A primary concern is that an uncompromised UBI is financially unviable. In the 2016 Presidential Campaign, Andrew Yang's 'Freedom Dividend', a proposal to give everyone \$12,000 per year came under scrutiny for being too expensive. The proposal would have cost \$3 trillion a year, which is ¾ of the US federal budget.⁴ Yang's proposed 10% Value Added Tax (VAT), wouldn't come close to funding it. In fact, even the abolition of Medicare and Medicaid wouldn't pay for it.⁵

Alternative funding mechanisms have proven more durable but are not able to achieve UBI's vision of covering all basic essentials.

Since 1982, Alaskans have benefitted from the region's rich

oil reserves, enjoying a small ongoing dividend via the Alaska Permanent Fund. However, the fund only provides on average between \$1,000-\$2,000 per year to its citizens, and hence is not large enough to support a living.⁶ Alternative funding schemes have effectively become scaled-down models of UBI.

Alternatively, there have been a few pilot programs which are more akin to an NIT. They are more targeted in their welfare distribution and subsequently able to get closer to offering a basic income. 'Mincome' was trialed in Manitoba, Canada.⁷ However, again, the policy was very modest, setting in place an income floor of 50% of household income. Hence, it could not support basic necessities. The policy only lasted 5 years, until it was abandoned in 1975.

Skepticism regarding the financial viability of UBI is compounded by concerns that if a UBI causes a labor shortage, the resulting decrease in income will mean there is a smaller stock of wealth for government to tax and therefore dispense as UBI payments.

A population of couch-potatoes in the land of UBI?

How labour supply will be affected remains one of the critical questions in UBI discussions. The answer to this has implications not only for the financial viability of UBI, but also for UBI's broader goals. Proponents of UBI argue that short-term labour shortages would enable people to pursue the career of their choosing^{8,9,10} and enable better matching of jobs to candidates. Less pressure to immediately find a new job to pay the bills means more time to relocate, upskill or attend multiple interviews before accepting the best offer. In the long term, this can potentially create more wealth as people are more highly skilled and are better matched to jobs. However, the effects of UBI on labour supply and the labour market are still empirically unclear.

The modest dividend provided by the Alaskan Permanent Fund has resulted in a 17% hike in part time employment.¹¹, which shows that the recipients have taken the opportunity to work less, however, are still working. Whilst the Alaskan case indicates minimal effect on the labor market, the effects a larger scale UBI would have are still unknown.

In 2017, an unconditional UBI was created in Finland, initially targeting 2,000 unemployed residents on 560 euros per month.

1 Lowrey, A. (2018). Give people money: how a universal basic income would end poverty, revolutionize work, and remake the world: Broadway Books.

2 David, H. (2015). Why are there still so many jobs? The history and future of workplace automation. *Journal of Economic Perspectives*, 29(3), pp. 10-12

3 Straubhaar, T. (2017). On the economics of a universal basic income. *Intereconomics*, 52(2), 74-80.

4 Standing, G. (2004). About time: Basic income security as a right. Promoting income security as a right: Europe and North America, p10.

5 Ibid, pp. 10-12

6 Van Parijs, P. (2004). Basic income: a simple and powerful idea for the twenty-first century. *Politics & Society*, 32(1), 7-39.

7 Ibid, p. 9

8 Hoynes, H., & Rothstein, J. (2019). Universal basic income in the United States and advanced countries. *Annual Review of Economics*, 11, 929-958. p5-6

9 Ibid, p. 7

10 Ibid, p. 9

1 Tondani, D. (2009). Universal basic income and negative income tax: Two different ways of thinking redistribution. *The Journal of Socio-Economics*, 38(2), p251

2 Van Parijs, P. (2004). Basic income: a simple and powerful idea for the twenty-first century. *Politics & Society*, 32(1), p12.

3 Standing, G. (2004). About time: Basic income security as a right. Promoting income security as a right: Europe and North America, p8.

4 Kearney, M. S., & Mogstad, M. (2019). Universal basic income (UBI) as a policy response to current challenges. Report, Aspen Institute, p7

5 Ibid, p. 7

6 Hoynes, H., & Rothstein, J. (2019). Universal basic income in the United States and advanced countries. *Annual Review of Economics*, 11, p947.

7 Ibid, p. 948

8 Van Parijs, P. (2004). Basic income: a simple and powerful idea for the twenty-first century. *Politics & Society*, 32(1).

9 Standing, G. (2004). About time: Basic income security as a right. Promoting income security as a right: Europe and North America, 1-39.

10 Bregman, R. (2017). Utopia for realists: And how we can get there: Bloomsbury Publishing.

11 Rasoolinejad, M. (2019). Universal Basic Income: The Last Bullet in the Darkness. arXiv preprint arXiv:1910.05658.

The program also did not see major changes in the labor market. However, it was abandoned before it could be expanded into something analogous to a UBI.

There is clearly a lack of UBI programs which have endured long enough as well as being close enough to the true UBI model to provide sufficient data to identify labour market effects.

Is UBI truly able to reduce inequality?

Finally, one of the main motivations in instituting a UBI is to reduce inequalities. Proponents have argued that a decreased need to work will give people more time to invest in skills and education. This has the potential to increase entrepreneurship and actually have a healthy overall effect on the economy.^{1,2,3} Human capital increases have positive effects on both labor supply and wages as higher skilled individuals work more and earn higher wages. However, opponents argue that this is a mere 'band aid' solution to the current employment trends. Opponents argue that the money from UBI would be better spent on skills training that encourages employment.

Further, opponents have argued that existing welfare programs do a better job of reducing inequalities as they are more targeted.

Scholars argue that the policy's desire to be universal



Image: https://upload.wikimedia.org/wikipedia/commons/f/f9/Money_Cash.jpg

1 Bregman, R. (2017). Utopia for realists: And how we can get there: Bloomsbury Publishing.

2 Marx, A., & Peeters, H. (2008). An unconditional basic income and labor supply: Results from a pilot study of lottery winners. *The Journal of Socio-Economics*, 37(4), p1637

3 Hoynes, H., & Rothstein, J. (2019). Universal basic income in the United States and advanced countries. *Annual Review of Economics*, 11, p945.

4 Kearney, M. S., & Mogstad, M. (2019). Universal basic income (UBI) as a policy response to current challenges. Report, Aspen Institute, p3.

5 Hoynes, H., & Rothstein, J. (2019). Universal basic income in the United States and advanced countries. *Annual Review of Economics*, 11, 929-958.

6 Kearney, M. S., & Mogstad, M. (2019). Universal basic income (UBI) as a policy response to current challenges. Report, Aspen Institute, 1-19.

7 Dawson, E. (2020). Why the progressive left should oppose a universal basic income. *The Financial Review*. Retrieved from <https://www.afr.com/policy/economy/why-the-progressive-left-should-oppose-a-universal-basic-income-20200506-p54q6r>

reduces the aid it can give to those in need.^{4,5}

Hence, there is general accord that UBI-inspired policies should not be universal, so they can target specific income groups that are more in need.⁶

Other concerns have been raised over the effect the removal of public healthcare and education could have on lower income individuals.⁷ Whilst, most UBI proponents support these key social institutions, advocates are yet to prove how a UBI will be paid for without significantly paring down existing social programs. Hence, an NIT is favored as both more affordable and targeted in combatting inequalities.

Is UBI here to stay?

UBI represents a radical shift in modern welfare policy. It says that no longer will we have to work nor earn below a certain threshold to have a bed to sleep on and food in our bellies. We'll even have time to pursue our dream careers. Or at least in theory. Whilst its intentions are noble, a truly unconditional UBI has thus far proven unaffordable, and truncated versions of the idea have proven less apt at targeting inequalities than existing welfare policy. Hence, questions remain if UBI can truly establish itself in the mainstream outside of wishful thinking of elites standing in their ivory towers.

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Photo by Min An from Pexels

COVID-19: A happy green ending?

Ronald Poon

Can COVID-19 take us off the path of self-destructive attitudes towards climate change?

It's hard to imagine a silver lining from all the hardship and chaos that has ensued over the past few months. For many of you, 2020 will always be remembered as the year travel was cancelled, the year sports was cancelled and the year even ESSA Trivia Night was cancelled! As sad as these cancellations may be, our recent hibernation hasn't been all bad. In fact, it's actually created some positives - most notably for our environment.

Air and water quality has improved dramatically - with reports of clear streams, clean rivers, and blue skies occurring across the world. China's CO2 emissions dropped by a staggering 25%. Meanwhile global emissions are predicted to fall by around 4-8% this year (6-10 times larger than that of the GFC).¹ But these amazing and positive effects are all short-term. As we resume our busy lives and start travelling for work again, carbon emissions will no doubt rise. If the rapid growth in emissions after the last global recession in 2009 is anything to go by, it looks like fossil fuels will be coming back - with vengeance!

But it doesn't have to be this way. We don't have to repeat our previous mistakes, and we certainly don't need another lockdown to keep our carbon emissions at bay! What we need instead, is a transition to a 'cleaner growth path'. An economy with more renewables, and a heavily decreased reliance on fossil fuels. COVID-19, despite all its pain and afflictions, has actually taught us a great deal on how to achieve this ambitious transition to a 'clean, green economy'. Here are three lessons we can learn and apply to our current climate crisis:

1. We need to trust the experts

Not all of us can become a climate scientist overnight - just like how none of us became a doctor, epidemiologist or public health expert overnight from watching a Fox News story.

We need to trust the experts. We need to trust the data and scientific models they use, and we need to start forming our economic policies off of them now! Climate change is not some crazy 'Chinese hoax' or left-wing conspiracy. It's real, very real - and it's going to impact your life in more ways than you can imagine.

Remember the early days of COVID-19? The good old days where you thought to yourself - 'What's everyone panicking for?' and 'Why does everyone need so much toilet paper?' Well, just like how a tiny virus was able to infiltrate every aspect of your life (including toilet paper consumption!) - climate change will too. It will be equally as destructive (if not more)... 1.5 degrees of warming may not sound like much, but when you start considering the 2nd and 3rd order effects it'll have on health, immigration, infrastructure, and agriculture - it starts to really add up! (Much like how coronavirus was able to completely decimate our economy).

We need to believe experts who have dedicated their entire life's work mission to saving our planet. We need to trust economists when they say it could cost us over \$5 trillion in the long-run.² Just like how we averted a health crisis by following expert opinions and scientific modelling - we can avoid a global climate crisis - if we start acting now.

2. We need social safety nets

We need to protect the most vulnerable households: the ones who truly can't afford to pay an extra dollar on fuel or electricity. But the only way we can support these households, is by raising more government revenue - which is exactly why we need a carbon tax (again!)

Woah, woah, woah - stop right there... 'Did you just suggest a

Image: https://www.google.com/url?sa=i&url=https%3A%2F%2Fpixabay.com%2Fphotos%2Fenvironment-ecology-nature-2196690%2F&psig=AOvVaw3N-bWNsr26oIW_XqbcHRyT&ust=1597143405915000&source=images&cd=vfe&ved=0CAIQjRqFwoTCOCT4IG9kOsCFQAAAAAAdAAAAABAK

¹ Carbon Brief. (2020, April 9). Analysis: Coronavirus set to cause largest ever annual fall in CO2 emissions. Retrieved from <https://www.carbonbrief.org/analysis-coronavirus-set-to-cause-largest-ever-annual-fall-in-co2-emissions>.

² Kompas, T., Witte, E. and Keegan, M. (2019). Australia's Clean Energy Future: Costs and Benefits. MSSI Issues Paper 12, Melbourne Sustainable Society Institute, The University of Melbourne. [be-sustainable-post-COVID-19](https://www.mssi.org.au/australias-clean-energy-future-costs-and-benefits).

regressive tax for low-income households?' 'Yes, I did - now hear me out!' A carbon tax not only provides much needed government income for social safety nets like JobSeeker or Youth Allowance, but from an economic perspective, it's also more effective at reducing GHG emissions.

When compared with our current subsidy scheme (the Emissions Reduction Fund), our old 'carbon tax' (Pricing Strategy) led to more abatement (at lower-cost!), and less public funds being wasted on 'transaction costs'.³ Moreover, it actually had positive redistribution effects, with about half the money going back into the pockets of low and middle-income earners.

As coronavirus has shown us recently, we need social safety nets. We need to protect low and middle-income families - but that money doesn't just come out of thin air! We need to start raising taxes in the right areas, and lowering them in others. It's scary knowing we don't have a 'domestic emissions policy' plan in place beyond this year. We need to start doing things differently and we need to start thinking long-term.

3. We don't have to 'stick to the status quo'

As the famous High School Musical song goes: 'if you want to be cool, follow one simple rule... stick to the status quo.' We've come a long way since 2006 and our primary school crush on Troy Bolton/Gabriella Montez. Caring about the environment is cool now! In 2020, being 'cool' most likely

consists of: eating less meat, buying sustainable food/fashion, offsetting your miles, (staying inside...), and riding a cool European vintage bike!

What coronavirus has taught us, is that we don't have to 'stick to the status quo', in order to be happy. Our utility functions and consumption have changed in ways we would not have expected just months ago and it's hard to predict how they will continue to evolve. We're not driving as much, flying as often, or spending money on the things we used to. It's hard to put a number on anything at the moment. All we can know (and really be certain about) is that we're headed towards a new equilibrium, and it doesn't have to look anything like the old one.

In this new equilibrium, we could see more cycleways, less cars, 'smarter cities',⁴ more urban agriculture, less over-tourism/over-crowding, and more 'mindful travelling'.⁵ Maybe this story does have a happy green ending after all! Maybe this time we'll get it right. We don't have to 'stick to the stuff [we] know'. As this pandemic has quite clearly shown us, we are capable of so much more - we just have to realise it, and own it.

Ronald is a current 5th year Commerce and Law Student (with a major in Economics and minor in Sustainability). In his spare time he likes to cook, read, cycle, play tennis, teach swimming and rewatch episodes of Avatar the Last Airbender.



³ Freebairn, J. (2014). Carbon Price versus Subsidies to Reduce Greenhouse Gas Emissions. *Economic Papers: a journal of applied economics and policy*, 33(3), 233. doi: 10.1111/1759-3441.12082

⁴ Smart Cities World. (2020, May 7). COVID-19 accelerates the adoption of smart city tech to build resilience. Retrieved from <https://www.smartcitiesworld.net/news/news/COVID-19-accelerates-the-adoption-of-smart-city-tech-to-build-resilience--5259>.

⁵ Berge, C. (2020, April 16). How can we be sustainable post-Covid 19?. BBC Travel. Retrieved from <http://www.bbc.com/travel/story/20200415-how-can-we-be-sustainable-post-COVID-19>.

The fall of Virgin Australia

Klinsmann Lee

The impact of travel restriction imposed by many countries to contain the spread of the coronavirus has devastated many airlines, including Virgin Australia. Klinsmann Lee takes a look at the fall of Virgin Australia and the potential impact on the aviation market.

The economic impacts from the coronavirus pandemic have devastated the aviation market. With travel restrictions collapsing the demand for air travels, this has pushed the highly indebted airline, Virgin Australia, into voluntary administration on 21st April 2020.¹ However, with thousands of jobs lost and the possibility of a Qantas domestic air monopoly, why did the Federal Government reject the emergency loan Virgin has requested? This article takes a look at the downfall of Virgin Australia.

Virgin Australia's financial problem

Virgin Australia initially operated as a budget carrier that grew steadily in the low-cost market. However, as competition intensified with the launch of Jetstar in 2003, Virgin has responded with a strategic change by moving towards a low-cost full-service business model.² This resulted in Virgin not only sacrificing its cost advantage but accruing debts to fund the capital required to upgrade their products and premium services. Furthermore, this positioning has proven to be ineffective as price-sensitive corporate passengers choose either Jetstar for lower airfare or Qantas for the full-service experience.³ Over the past decade since 2010, Virgin Australia has only achieved two full-year profits.⁴ This problem is further exacerbated by its poor financial health. In its latest reporting, the company has \$1.1 billion cash holding but an ugly \$5.3 billion debt pile.⁵ These financial numbers only signal the warning for Virgin Australia. The coronavirus pandemic has simply pushed Virgin to the edge of insolvency as the government's travel restrictions and fears of COVID-19 forces

the airline to reduce capacity.

The combination of incurring large fixed cost and declining revenue means that Virgin Australia is 'burning cash' each month.

Is Virgin Australia 'too big to fail'?

The Federal Government rejected the \$1.4 billion and later \$200 million loan requested by the company, arguing that the market, not the government, should provide the cash injection it desperately needed.⁶ However, is Virgin 'too big to fail'? According to IBISWorld, the domestic aviation industry consist of two dominant players: Qantas (59 per cent market share) and Virgin (32 per cent market share).⁷ With the collapse its main competitor, Qantas would essentially achieve a monopoly within the domestic aviation market in Australia. Furthermore, it is difficult to assume another airline will simply enter the market to take over the Virgin's market share given the current global economic conditions and high barriers of entry (such as capital intensity requirements and regulation). Additionally, with the collapse of Virgin Australia, more than 10,000 direct employees and 6,000 contractors' jobs involved in the supply chain will be made redundant.⁸ This also creates a domino effect that would negatively impact the wider tourism and hospitality industry as the competition within the aviation industry helps avoid higher airfares. The increased capacity and more routes available in air travel helps to increase the number of travellers.⁹ The domino effect extends to Virgin's creditors, investors, suppliers and customers

1 ASX. (2020). Virgin Australia Enters Voluntary Administration. Retrieved from <https://www.asx.com.au/asxpdf/20200421/pdf/44h3kq7kcb12fi.pdf>

2 Sciberras. D. (2020, May 6). Virgin Australia v2.0 full-serve or LCC? Why only one of these make sense. Point Hacks. Retrieved from <https://www.pointhacks.com.au/virgin-australia-post-administration/>

3 Bartholomeusz. S. (2020, April 23). Back to the Future strategy is Virgin's best bet for survival. The Sydney Morning Herald. Retrieved from <https://www.smh.com.au/business/companies/back-to-the-future-strategy-is-virgin-s-best-bet-for-survival-20200423-p54mi7.html>

4 Morningstar. (2020) Virgin Australia Holdings Limited VAH. Retrieved from <https://datanalysis-morningstar-com-au.ezproxy.lib.monash.edu.au/ftl/company/profitloss?ASXCode=VAH&rt=A&sy=2010-01-01&ey=2020-12-31&xm-licensee=datpremium>

5 Virgin Australia Group. (2020). Virginal Australia Holdings Limited (ASX: VAH). 1H20 Results. Retrieved from <https://www.virginaustralia.com/cs/groups/internetcontent/@wcd/documents/webcontent/~edisp/fy20-h1-interim-report.pdf>

6 Khadem. N. (2020, April 30). Virgin Australia owes almost \$7b to more than 12,000 creditors. ABC. Retrieved from <https://www.abc.net.au/news/2020-04-30/virgin-australia-owes-7-billion-creditors-meeting-administration/12198130>

7 Youl. T. (2020, March). Domestic Airlines in Australia. IBISWorld. Retrieved from <https://clients1-ibisworld-com-au.ezproxy.lib.monash.edu.au/reports/au/industry/default.aspx?entid=472>

8 Butler. B. & Davies. A. (2020, April 21). Virgin Australia: what does voluntary administration mean and how will it affect you? The Guardian. Retrieved from <https://www.theguardian.com/business/2020/apr/21/virgin-australia-what-does-voluntary-administration-mean-and-how-will-it-affect-you>

9 Khadem. N. (2020, April 23). Virgin Australia's future will shape the national outlook for jobs, tourism. ABC. Retrieved from <https://www.abc.net.au>

who face significant losses.

Arguably, Virgin's financial health is deteriorating even before the pandemic impacted the aviation industry. Furthermore, The Federal Government has already provided a \$715 million support package to the aviation industry through waiving certain charges.¹ By providing a cash injection to Virgin Australia, this is also unfair to its competitor, Qantas, which is in a more robust financial position.

Impact on airfares and the aviation market

To determine the impact on airfares, the collapse of Ansett Airline would provide a good estimate to this effect. When the company fully ceased operations on March 2002, we observed the lowest airfares rising temporarily between February to April 2002 [Figure 1].



[Figure 1] Domestic Air Fare Index (adjusted for inflation) between 1999 - 2005. Source: Department of Infrastructure, Transport, Regional Development and Communications (Australian Government).

Not surprisingly, the reduced capacity from the collapse Ansett allowed existing airlines to increase ticket prices. However, the trend has declined beginning in 2004 with increased competition from the commencement of Qantas's low-cost subsidiary, Jetstar. From [Figure 2], we observe that this competition has helped to lower the trend of airfares after 2004.



[Figure 2] Domestic Air Fare Index (adjusted for inflation) between 2006 - 2020. Source: Department of Infrastructure, Transport, Regional Development and Communications (Australian Government).

1 Khadem. N. (2020, March 31). Virgin Australia seeks \$1.4 billion coronavirus bailout, Qantas says if that happens, it wants \$4.2 billion. ABC. Retrieved from <https://www.abc.net.au/news/2020-03-31/virgin-seeks-coronavirus-bailout-qantas-warns-against-payouts/12105654>

2 Anonymous. (2011, September 12). Ansett's collapse set decade of positive change for aviation in Australia – and beyond. Centre for Aviation (CAPA). Retrieved from <https://centreforaviation.com/analysis/reports/ansetts-collapse-set-decade-of-positive-change-for-aviation-in-australia--and-beyond-58536>

On the other hand, the collapse of Ansett has allowed Qantas to hold a monopoly on corporate market share. Contrasting to lowest airfare, business airfare has maintained a steady increase between 2002 to 2011 [Figure 1, Figure 2].²

Based on this analysis, we can expect that Qantas will quickly acquire the market share from the collapse of Virgin Australia. Yet, unlike the previous situation, the threat of low-cost flights will not force Qantas to compete intensely given that it now has its own low-cost carrier, Jetstar. This makes other existing regional airline operators such as Regional Express and Alliance Aviation Airlines difficult to gain further market share. The effect of this possible monopoly status will mean that airfares will rise temporarily but for a longer period comparing with the past.

In this period of unprecedented times, governments around the world have provided financial aids to their aviation industry to support airlines through this crisis. Whether or not Virgin Australia should be bailed out is a matter of opinion and judgement. However, an important question to consider is whether the Federal Government would bail out Qantas if it faces a similar situation. Maybe? Maybe not?

Klinsmann Lee is a fourth-year commerce student interested in learning about different economic challenges that Asian countries are currently facing. A follower of Peter Lynch's investment philosophy.

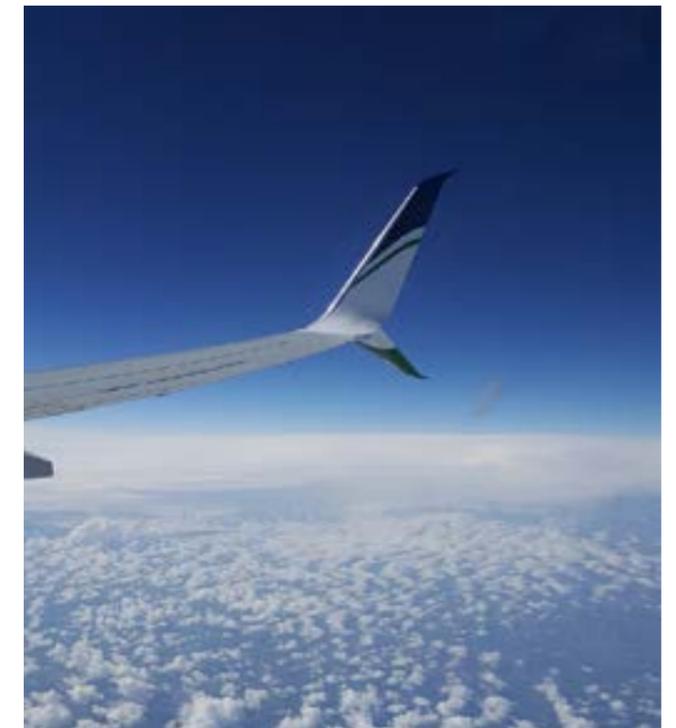


Image: Retrieved from <https://www.needpix.com/photo/788368/plane-clouds-view-flight-airplane-travel-aircraft-jet-sky>

How COVID-19 is challenging capitalism

Jessica Tang

Has it reached its use-by date? Jessica Tang takes a closer look at how COVID-19 is challenging capitalism.

Economists are rushing to the roundtable for a discussion about capitalism as a going concern.¹ Not only has the COVID-19 pandemic shifted our priorities, it's also exposed some of the vulnerabilities that threaten the capitalist system. Is it possible that the economic system that has dominated the Western world for 400 odd years is about to see itself out? And what role does 'the 9/11 of our generation' play in all of this? Let's look at the three Cs – COVID-19, capitalism and consumerism.

An impact analysis of COVID-19

COVID-19 is a deadly virus, but that hasn't stopped its economic impact from taking centre stage. With most of the world on some variation of a lockdown, COVID-19 has caused major disruption to the ways in which we live, work and participate in society. Some are suggesting that COVID-19 will be known in history books as the biggest economic crisis of our generation. People are losing their jobs by the tens of millions, consumer spending has slumped to new lows and well-to-do businesses are suddenly forced into shutdown mode.² This sudden hit has prompted governments across the globe to adopt desperate measures – measures that have thrown the perpetuation of capitalism into question.

Desperate times call for desperate measures

Governments have gone into crisis mode. Their weapon of choice? Generous stimulus packages to keep their economies afloat. In Australia, Prime Minister Scott Morrison announced an economic stimulus package which would see AUD\$66 billion fall into the hands of eligible Australians.³ In

the US, President Donald Trump has pledged to commit to a similar offering worth USD\$2 trillion.⁴ And yet, the budgetary constraints of these policies seem to be the last thing on everyone's minds. As economist Yanis Varoufakis puts it, 'The rules of capitalism may have been suspended – all those sacrosanct policies are gone, the neat separation of fiscal and monetary policy is gone, the idea that public debt is a bad thing is gone.'⁵ It's eerily similar to the wartime economies of our past.

But big spending isn't the only thing that sticks out. The events of COVID-19 have also exposed how the very fundamentals of capitalism are in conflict with society. Scott Morrison ripped into panic buyers when he firmly told stockpiling Australians to 'stop it,' denouncing the act as 'un-Australian.' Similarly, Home Affairs Minister Peter Dutton shamed profiteers who hoped to make some quick cash as supermarket aisles ran bare.⁶ There's really nothing too controversial here – in fact, most Australians would approve of this message. The problem here is that there is a fundamental flaw in viewing profiteering behaviour as being incompatible with Australian values. Recall that this is the same society that was built on capitalist ideals. Indeed, Ian Verrender argues that 'our entire system of economic production and social organisation is structured around profiteering.'⁷ Perhaps this phenomenon is best summed up by the once viral internet phrase 'late stage capitalism.' In a world where the citizens of wealthy countries are lining up by hundreds to purchase essentials, it's becoming more and more difficult for us to wear the capitalism badge proudly. Even private retailers (emphasis on the 'private') have resorted to setting aside special shopping hours for the elderly and those with disabilities.⁸ What we're now

¹ Varoufakis, Y & McWilliams, D (2020, May 6). "There is a glimmer of hope": economists on coronavirus and capitalism.' The Guardian, <https://www.theguardian.com/world/2020/may/06/there-is-a-glimmer-of-hope-economists-on-coronavirus-and-capitalism>

² Twenge, J (2020, Mar 18). 'The coronavirus could be Generation Z's 9/11.' The Conversation, <https://theconversation.com/the-coronavirus-could-be-generation-zs-9-11-133740>

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⁴ Kane, L & Loudenback, T (2020, May 7). 'Everything we know about the coronavirus stimulus checks that will pay many Americans up to \$1,200 each.'

Business Insider, <https://www.businessinsider.com/personal-finance/coronavirus-stimulus-check-questions-answers-2020-4?r=AU&IR=T>

⁵ Varoufakis, Y & McWilliams, D (2020, May 6). "There is a glimmer of hope": economists on coronavirus and capitalism.' The Guardian, <https://www.theguardian.com/world/2020/may/06/there-is-a-glimmer-of-hope-economists-on-coronavirus-and-capitalism>

⁶ Nelson, J (2020, Mar 19). 'Dutton Vows to Come Down 'Like Tonne Of Bricks' On Panic-Buyer Buses,' Channel News, <https://www.channelnews.com.au/dutton-vows-to-come-down-like-tonne-of-bricks-on-panic-buyer-buses/>

⁷ Verrender, I (2020, Apr 6). 'Is capitalism dying or just in isolation during the coronavirus pandemic?,' ABC News, <https://www.abc.net.au/news/2020-04-06/is-capitalism-dying-or-just-in-isolation-coronavirus/12123874>

⁸ ABC News (2020, Apr 6). 'Coronavirus sees Woolworths, Coles combat panic-buying with special hours for seniors, people with disabilities,' ABC News

experiencing has been dubbed the suspension of capitalism. All it took was a pandemic.

Was capitalism always destined to collapse?

There is no doubt that we have capitalism to thank for many of the luxuries that we take for granted. But this isn't a discussion about freedom, efficiency or innovation. This is a discussion about sustainability. And this leads us to the big question – was capitalism always destined to collapse? To answer this question, we need to consider what has been keeping the capitalist system from crumbling. That's where consumerism comes in. Capitalism is a system that requires the masses to go to work so that they can benefit from the fruits of their labour. With most the world going into lockdown, there is no money to be made and no money to spend! For many, this isn't exactly news. It's common sense that consumption leads to economic growth. The problem here is that our global economy has become *too dependent* on us spending our money on things that we don't need.² Economics 101 will tell us that we have limited resources and unlimited wants. Let's turn our attention to the ongoing climate change crisis. Despite environmentalists' efforts to get the world to stop over-consuming, there exist major concerns that this movement would cripple our global economy.³

It's very probable that we've set up an economic system that just doesn't get along with sustainability. How then, can it survive?

Another indicator suggesting that capitalism was always destined to collapse is that it always ends in bailouts. Again, this isn't about right vs. wrong. This is about bringing to light the inconsistencies that exist within capitalist societies. An economic system in which banks and airlines need rescuing by governments can't possibly champion sustainability.⁴ Perhaps that's why so many experts are now calling on governments to rethink capitalism.

This purpose of this article isn't to predict what economic system should succeed capitalism – we'll leave that to the experts. Whatever that outcome will be, there is one general consensus and it's that capitalism is about to mutate into something different.⁵ Economist David McWilliams sums this up well by stating, 'I don't know where we are going, but one thing seems clear – we are not going back.'⁶ To translate that into COVID-19 lingo, 'life will never be the same again.'

Jessica Tang is a final year Economics student. After unwittingly getting hooked on Question Time some years ago, she decided to pursue economics. Looking back now, she's convinced that it was one of the best decisions that she's ever made.

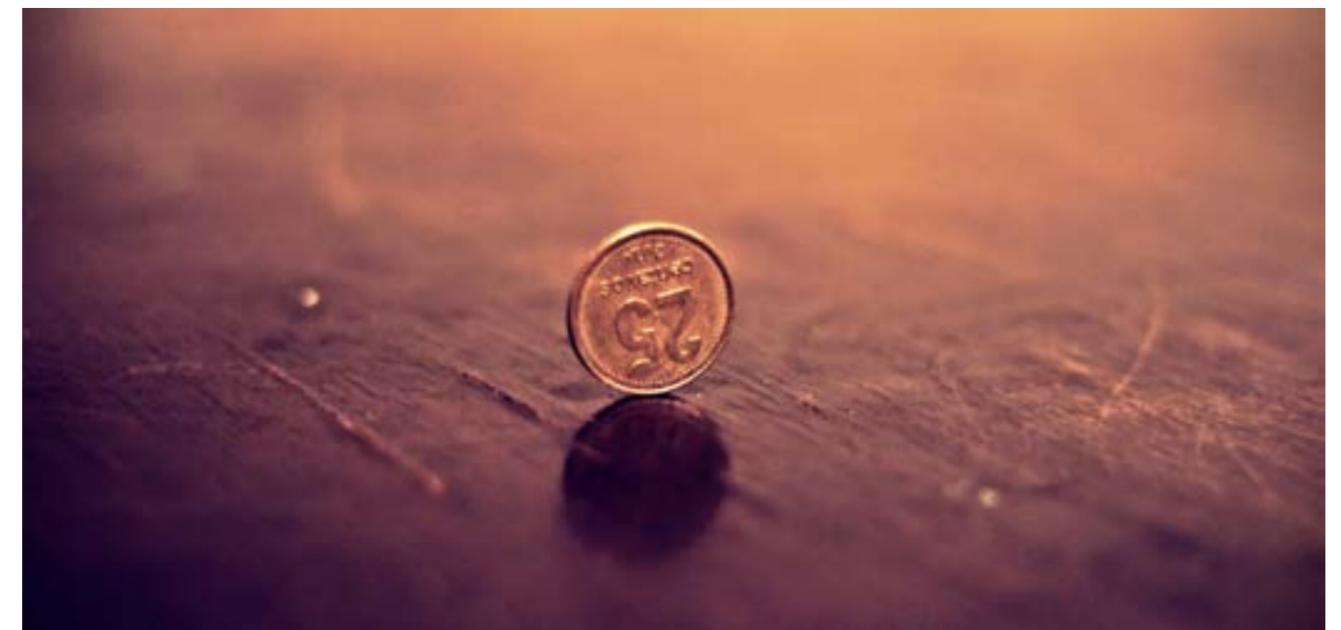


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³ Denny, L (2020, May 11). 'Virus exposes cracks in our economy,' The Mercury, <https://www.themercury.com.au/news/opinion/coronavirus-pandemic-exposes-cracks-in-nations-economy/news-story/ebe6b899aa80cd4d4bde535193b3de6e>

⁴ Ford, J (2020, Mar 29). 'Coronavirus bailouts must avoid the taint of 'corporate socialism'', Financial Times, <https://www.ft.com/content/69b197d6-08a2-4e0e-bf38-c976353e7e20>

⁵ Shvets, V (2020, Apr 18). 'Lethal virus also killing capitalism,' Financial Review, <https://www.afr.com/chanticleer/lethal-virus-also-killing-capitalism-20200417-p54kq5>

⁶ Varoufakis, Y & McWilliams, D (2020, May 6). "There is a glimmer of hope": economists on coronavirus and capitalism.' The Guardian, <https://www.theguardian.com/world/2020/may/06/there-is-a-glimmer-of-hope-economists-on-coronavirus-and-capitalism>

The Blame Game

Hooi San Ng

Can China be sued for their alleged misconduct in allowing the coronavirus to spread? Hooi San Ng explores.

Public opinion on China's effort to contain the pandemic has been sharply polarised. Whilst some praise China for its implementation of rapid and strict measures, others are not hesitant to demonstrate their outrage towards China's alleged mishandling of the situation. Following President Trump's racist rhetoric, multiple states in the US including Missouri, Florida, Texas and Nevada have filed private class action lawsuits against China demanding compensation for the damage caused by the coronavirus. The allegations broadly involve China's failure to report crucial public health information and its negligence in enabling the global spread of the coronavirus. Whilst it is valid to have personal opinions on China's response towards the outbreak, whether it is possible to hold China legally responsible for it is another matter. This article explores the legal liability of China amid this political blame game, which ultimately boils down to one question – can China be sued for the coronavirus?

The short answer is no.

Sovereign immunity

China is broadly protected under the international law doctrine of sovereign immunity, which exempts a sovereign state from the jurisdiction of another sovereign state's courts unless the state consents to waive immunity.² Under this absolute doctrine, litigation suits against China are practically inadmissible. This explains why there were no precedents of legal proceedings during episodes of the SARS outbreak in 2003 and the H1N1 pandemic in 2009. Legal claims against China cannot be disputed in a US court, based on the mutual understanding that equivalent tort claims against the US

would not be pursued in China's courts.

As international trade growth increased, countries started to develop a more relaxed approach to sovereign immunity.³ In 1976, the US codified the doctrine of sovereign immunity as the Foreign Sovereign Immunities Act (FSIA),⁴ allowing for commercial activity and territorial tort exceptions to sovereign immunity. However, even under the most permissive interpretations of this relaxed doctrine, there still aren't any satisfactory grounds for a waiver. Nothing appears to point towards China's legal liability, as none of their acts involve commercial activities, let alone commercial activities with a sufficient US nexus (the condition for a waiver).⁵ Their alleged failure at outbreak prevention is therefore simply an exercise of sovereign power that falls within the broad protection of sovereign immunity.

Failing to establish a case against China as a sovereign nation, attempts to circumvent the FSIA have also been made by naming the Communist Party of China (CCP) as the defendant and arguing that the CCP falls outside the scope of FSIA.⁶ Given there are no other political parties in China, it would be difficult to argue that China and the CCP are not synonymous.⁷ Ultimately, the suit would still likely be treated as though it were filed against China.

As pointed out by China's Ministry of Foreign Affairs spokesman Geng Shuang, the lawsuits against China have 'no legal basis at all'.⁸ Unless China consents to the lawsuits (which is extremely unlikely), the prospects of successfully suing China for coronavirus seem dim.

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4 Foreign Sovereign Immunities Act, §1330, §1391(f), §1441(d), §1602–11.

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6 Watson, K., 2020. <https://www.cbsnews.com/news/missouri-sues-china-over-coronavirus/>. CBS News, [online] Available at: <<https://www.cbsnews.com/news/missouri-sues-china-over-coronavirus/>>

7 Republic of Phillipines et al. v. Jerry S. Pimentel [2008] U.S. 553 (Supreme Court of the United States), p.851.

8 Cave, D. and Qin, A., 2020. China Mounts Aggressive Defense to Calls for Coronavirus Compensation. The New York Times, [online] Available at: <<https://www.nytimes.com/2020/04/28/world/asia/coronavirus-china-compensation.html>> [Accessed 12 May 2020].

factual and legal basis at all.¹ Unless China consents to the lawsuits (which is extremely unlikely), the prospects of successfully suing China for coronavirus seem dim.

A change to the law?

Conceding that the doctrine of sovereign immunity would impede suits against China for damages caused by coronavirus, senators in the US even went so far as to propose amendments to the FSIA to strip China of its sovereign immunity and permit these claims.² However, arbitrarily moulding the law in favour of one's country negates the purpose of international law in the first place. Not only would it be a violation of international laws, but there is also a sensible reason behind the reluctance of international laws to create an obligation for payment of damages in the context of transboundary spread of contagious diseases – it can originate from any country.³ Penalising China in this instance could make the litigating country vulnerable to similar lawsuits in from other countries. Indeed, turning to other countries' infringement of international laws, it has been argued that the imposition of travel bans on China disregarded treaty obligations.⁴ Be that as it may, China had not demanded compensation for such violations. Reflecting upon the reality of when it might want to impose similar travel restrictions to defend against threats of future outbreaks from other countries, China has avoided litigation so as to maintain its political flexibility.⁵

In settings of infectious diseases, there is a shared incentive among countries to avoid litigation. Had such bills been passed, it would only guarantee reciprocal lawsuits for past outbreaks – like the Spanish flu or the H1N1 virus that potentially originated from the US – and future ones.⁶ An arbitrary change to the law would do nothing but cause further harm to foreign relations.

A push for independent inquiries

Putting aside the absurdity of bringing legal proceedings against China, it does seem appropriate to establish an in-

dependent investigation into the spread and origins of the coronavirus pandemic, as insisted by Australia's Prime Minister Scott Morrison.⁷ This proposal has however been harshly dismissed by China. After all, no investigations were demanded of other countries for prior outbreaks.

An investigation is crucial to shine a light on where each country fell short and to determine the proper measures required to prevent a similar outbreak from reoccurring.⁸ Such investigations should, however, be progressing towards the common objective of making improvements to global health governance and focusing less on the political rivalry between the US and China. All things considered, as we demand transparency from China, other governments should likewise deliver the same accountability.⁹

“ As we demand transparency from China, other governments should likewise deliver the same accountability ”

Whether an independent inquiry would eventuate at the end of this pandemic is still yet to be determined. Until then, the public can only continue to delve deep into entertaining conspiracy theories about the origins of the coronavirus: did it emerge from a wet market where wild, live animals were traded, is it a biological weapon designed in Wuhan laboratories to destruct mankind, or was the virus imported to Wuhan by the US military?

Hooi San Ng is a fourth-year Bachelor of Law/Commerce student, who enjoys the cut and thrust of economics, politics and everything in between.

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Economic afterimages of a tsunami

Joel Lee

Looking back at the 2011 Tōhoku Earthquake and Tsunami, Joel Lee explores how a natural disaster can be felt long after the waves have subsided.

In 2011, on the 11th of March at 2:46 PM, a 9.1 magnitude earthquake shattered the seabed of the Pacific Ocean, 70km off Japan's Oshiku Peninsula. One hour later, Japan's eastern coast was impacted by a colossal tsunami, which reached heights of 40m in some areas. The immediate aftermath was devastating, with over 15,000 confirmed dead, thousands more missing, and an estimated damage bill of USD \$235bn.^{1,2} Naoto Kan, the prime minister of Japan at the time, called it 'the most severe crisis in the past 65 years since World War II'.³ And devastating though the aftermath was, many find themselves still burdened by tsunami-borne costs.

The social cost of disaster-proofing

Today, around 395 kilometres of Japan's eastern coast is starkly bisected by 12-metre high seawalls. Costing around USD \$12bn to construct and bleakly utilitarian, they are dubiously valuable in many eyes.⁴ As an island nation, Japan's national and cultural identity is inextricably linked to the sea. For residents of these vulnerable areas, the social cost is inescapable.

'It feels like we're in jail, even though we haven't done anything wrong,' said Atsushi Fujita, an oyster fisherman. His town, Rikuzentakata, lost almost 2000 people on the day of the tsunami. Reiko Iijima, a tourist from further inland, used to enjoy 'drives along the beautiful ocean and bays.' 'Now there's not even a trace of that,' she lamented.⁵

Economic theory says that public goods such as these seawalls, are efficiently produced when the marginal cost to society is equal to the marginal benefit of consumption. Japan's geography means that the next tsunami is a question of

'when', not 'if'. However, the absence of a tsunami since 2011 means that the marginal benefit of seawalls will only be felt in the future. And yet the marginal financial and social costs to society are acutely felt today. Whilst economists may say seawalls make theoretical sense after tallying up today's 'social costs' against the future benefits of millions of lives saved, the pain and lived reality behind economic jargon such as 'social costs' should be acknowledged.

Risk preferences and psychological impact

Literature exploring the effect of natural disasters on survivors' risk preferences and behaviours has demonstrated that changes in risk preferences can linger for many years. However, the direction in which risk preferences shifted was not consistent, which could be attributed to variance in human emotions. One survey found that survivors of the Tōhoku Earthquake became significantly more risk tolerant. This was shown through panel data collected in April 2011 and January 2016 that measured a respondent's risk tolerance in a gambling game against the intensity of their earthquake experience.

Cameron and Shah (2015), on the other hand, found the opposite effect. The experimental design involved participants opting to choose from six different scenarios, each with a different expected payoff. Potential payoffs were worth several days' pay, so participants were highly incentivised to optimise their strategy. Greater risk aversion was demonstrated by those who had survived an earthquake or tsunami up to three years ago.⁶

Whilst these seminal papers demonstrate seemingly differing

Whilst these seminal papers demonstrate seemingly differing results, they do consistently support the idea that behavioural shifts can last for many years. For survivors of the Tōhoku Earthquake, the change in risk tolerance persisted during the time between the two surveys.¹ Those who had survived an earthquake or tsunami up to *three years ago* still displayed greater risk aversion in Cameron and Shah's (2015) study.

Whilst economists focus on risk preferences and behavioural shifts in their implications for insurance premiums and policies, these papers point towards how disasters can have psychological impacts that linger for much longer than one would expect. Indeed, many survivors of the tsunami report experiencing guilt, apathy, and depressive episodes.² Given Japanese society's lack of awareness of depression as opposed to more psychotic diseases³, it is likely this trend in economic literature is indicative of a greater, unaddressed mental health issue.

A sustained decline of health

Much like how our attention on natural disasters wanes after the astronomical damage to infrastructure, sanitation, and facilities⁴ has been repaired, research papers on the health impacts of natural disasters are often conducted in their recent aftermath. Whilst few and far between, some studies which have examined longer-term health impacts of natural disasters have found unsettling results.

Dismayed by the abundance of studies on the transient rather than long-term effect of natural disasters on heart attack rates, several Japanese doctors conducted a four-year study into long-term changes in survivors' heart attack rates. The research area was the Iwate Prefecture, as there was great variance in damage between the southern and northern halves. Areas with 10% or more of their residential area flooded were classified as 'severely damaged'. During the study period, the rate of non-fatal heart attacks did not significantly differ between regions. However, fatal heart attacks in severely damaged areas almost doubled in occurrence when compared with the expected incidence rate in Japan. Researchers found that around 83% of the increase in fatal heart attack rates could be attributed to the level of flooding suffered.⁵

Another team of researchers investigated the effect of the tsunami on long-term elderly disability rates. Previous studies had only investigated changes on a one-year scale at most. Using disability insurance statistics, they found that there was a sustained increase in elderly disability rates in disaster-stricken areas. This increase was sustained for 3 years after the tsunami. In 2014, the elderly disability rate had increased in affected coastal and inland areas by about 15% and 10% respectively. In unaffected areas, it had risen by only 6.2%.⁶

There is little empirical literature on the long-term relationship between natural disasters and health. However, here we have two studies providing statistical evidence that levels of health in affected areas declined for a sustained period of time. The reason for this is likely to be independent of the quality of healthcare, as healthcare systems of affected areas have since been rebuilt. One possible explanation relates to migration, as populations of most destroyed towns never returned to pre-disaster population levels⁷. Healthier and wealthier people would have moved to safer areas away from the coast, leaving the populations of these towns less healthy than average. However, the long-term impacts on the health of those affected by natural disasters merits closer investigation.

Lessons to learn

Of course, Japan has a great deal of social and cultural specificity that may strongly affect some of these issues. Some might argue that an above-average percentage of elderly people is the real reason for worse health outcomes, or that a cultural tendency to avoid speaking up lies behind the mental health crisis. However, these examples show that many costs of natural catastrophes can be suffered long after the event has left global consciousness. Investigating and researching these kinds of stories may help us better understand the true cost of natural disasters.

Joel is a third year economics student. Currently, he's enjoying his classes in international economics and industrial organisation.

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The White Island disaster: an economic analysis

Edward Meehan

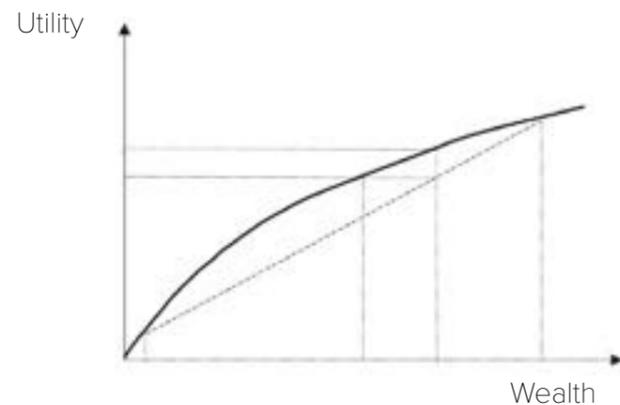
Would you visit a volcano if you thought it was dormant? Edward Meehan explores the deadly consequences of a lax adventure tourism market.

White Island, located 48 km off the coast of New Zealand, had long been a popular tourist destination. Renowned for its natural beauty, visitors came to see the steaming acid lakes, sulphur deposits and volcanic streams that could be found in the active volcano crater. But on 9th December 2019, 47 tourists who had made the visit to the island promoted as one of New Zealand's 'hidden gems' became trapped by a volcanic eruption. Twenty-one people died in the disaster and the tragedy became a global news story. Upon hearing of the terrible news, many people found themselves asking why tourists had been taken to an active volcano crater in the first place. Some tour operators suggested that the event was unpredictable and that similar trips had been operating for many years without incident.¹ Trips that carry with them a feeling of risk have long been a staple of New Zealand tourism, falling under the banner of 'adventure tourism'. The study of economics can help shed some light on what drives the demand for these trips. This article will examine how the concepts of 'risk aversion' and 'information asymmetry' apply to the adventure tourism industry.

A key concept in economics is that of utility. In its most basic form, this refers to the value or satisfaction people obtain from consumption.² Economics supposes that people will act rationally and make decisions which maximise their utility. Although it is an abstract concept, for the purposes of utility theory, utility is given a numeric value. This allows the relationship between utility and wealth to be represented graphically as often seen in diagrams like [Figure 1.1]. But what decisions will people make when the outcome of a purchase is uncertain? When a consumer cannot be assured that they will obtain utility and when a purchase may in fact cause them significant harm, the decision they will make depends on their level of risk aversion.³ Traditionally applied to areas such as the stock market or gambling, the concept of risk aversion can help us to understand some of the driving forces in the adventure tourism sector.

Many of us are risk averse – we would prefer a sure invest-

ment to a risky one. Economists tell us that when stakes are very high, this is doubly true. The more there is to lose, the more cautious we become. Conversely, some people are risk lovers. A risk lover finds excitement in taking risk and this is a form of utility in its own right.⁴



[Figure 1.1]

This may help explain why some people are drawn to extreme sports such as BASE jumping and cave diving while others have no interest in them at all. For risk lovers, the perception that their very lives may be at stake only adds to the excitement or utility experienced. For those of us of a less adventurous persuasion, the opposite holds true. There will always be risk takers and daredevils whose dangerous hobbies confound the rest of us. However, it is not only daredevils who partake in adventure tourism. You may yourself have gone bungee jumping, skydiving or taken a ride in a hot-air balloon. While these activities may be scary, most who partake in them probably do so because they believe the risks are relatively low. The risk probably is low in most cases, but it requires a degree of faith in the businesses that provide these experiences. Most people do not know how to judge the quality of a bungee cord. As consumers, we do not have all the information about the risks we are facing. In extreme

cases, this can have deadly consequences. Information asymmetry refers to a situation that arises when one side of a transaction has more information than the other.¹ As previously stated, economists tell us that for people who are risk averse, the higher the stakes of a risky venture, the less likely people are to undertake it. If tourists are unaware of how much of their wealth or in this case, health and safety, is at risk, then they are likely to make a decision they may otherwise not have made. A law firm acting for the victims of the White Island disaster alleged that tour operators told patrons 'absolutely nothing' about the possibility of a volcanic eruption. This was despite the fact that scientists observing the volcano had judged the island to be high risk in the weeks leading up to the tragedy.² While investigations have not yet concluded, it seems possible that information asymmetry may have been present. This could have led some patrons to underestimate what was at stake when they made the fateful decision to visit White Island. Some of these patrons may never have boarded the cruise if they were fully aware of the potential for eruptions.

A Four Corners report asked Brian Dallow, the father of one of the victims of the tragedy, whether he believed his son would have visited White Island had he known of the recently increased alert level. 'Pretty well sure he wouldn't have... almost certain,' he replied.³

Disasters are often unpredictable. However, in many cases, they are also avoidable. A full picture of the causes of the White Island Volcano disaster may not be known for some time. Nevertheless, the tragic loss of life should serve as a reminder to the adventure tourism industry of the grave risks, however remote, associated with many of its services. A comprehensive effort to educate customers about these risks should always be a top priority.

Edward is a Monash Medical student who is currently completing a Master of Public Health degree. In his spare time he enjoys playing sports and watching Netflix.



Image: https://commons.wikimedia.org/wiki/File:White_Island,_New_Zealand.jpg

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How disasters help advance society

Gabriel Chenkov-Shaw

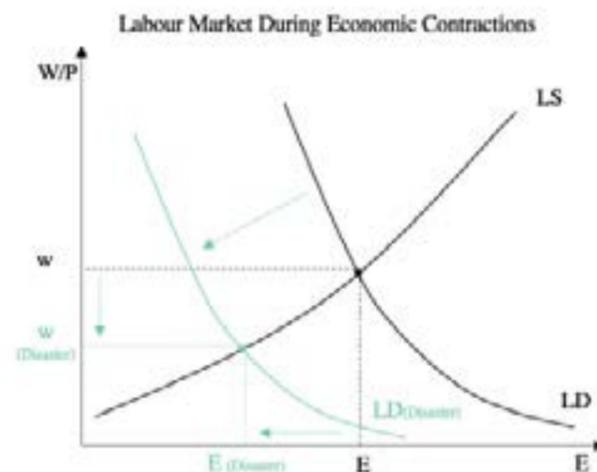
Could there be a silver lining to the COVID-19 pandemic? Gabriel Chenkov-Shaw explores how disasters can encourage innovation and progress in fields ranging from entertainment streaming services to Indian robotics.

Have you ever heard the cliché motivational quote that ‘diamonds are made under pressure’? The analogy reassures us that some of the most magnificent and valuable creations spawn through the most stressful of circumstances. This is because when we are under pressure, we have a likelihood of finding new and improved abilities. Though the diamond comparison is littered all over social media, it paints the perfect picture of why we should remain optimistic in times of peril. The most widespread example of this phenomenon is when the whole world is impacted by unpreferable conditions which produces immense ingenuity. This is exactly what we are facing currently, and we are bound to see a select few organisations and individuals skyrocket due to their ability to harness the opportunity rather than giving into the pessimism.

The reason why we see a boost in innovation and entrepreneurship during these periods is because of a change in the way people behave. This behaviour changes because traditional methods of making a living dry up, especially during these recessionary scenarios. With jobs disappearing and less money circulating, the attitudes of individuals change to find new ways to survive. Masses have been forced out of their comfort zone of earning a consistent income and relative stability. This is where tradition is challenged, and new angles of thinking are developed. This can be powerful and ultimately beneficial for society.¹ In a theoretical sense, disasters that induce economic contractions produce the following relationship.

Figure 1.1 shows that as Labour Demand (LD) shifts down and to the left to $LD(Disaster)$, employment (E) falls significantly by the amount of E minus $E(Disaster)$. This also influences Market wages (w) which fall from w to $w(Disaster)$.² In essence, this renders traditional methods of earning a living somewhat deficient. With adequate jobs now scarce, people still need to

survive which leaves two main options: Collect a non-labour income or get creative with how to make money. Those that pick the latter will realise that the current economic climate has changed drastically which facilitates compelling opportunity for new ideas to sneak in.³ During the dot-com bubble (an infamous recession), the global powerhouses of Netflix and Apple transformed themselves due to volatile market conditions. In the case of Netflix, they managed to overtake their rivals due to their sheer willingness to latch onto fast emerging trends in the entertainment industry.⁴ It is undeniable that Netflix have risen to the upper echelon of entertainment and can attribute their performance outside their comfort zone for their ascension.



[Figure 1.1]

1 White, S. (2016). Want to foster innovation? Get out of your comfort zone. Retrieved 15 May 2020, from <https://www.cio.com/article/3045839/want-to-foster-innovation-get-out-of-your-comfort-zone.html>

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These unpredictable conditions that inundate the status quo allow the proactive to pivot their ideas. This is true not only in a capitalist sense for achieving a profit but also as a public service to all of society. The current pandemic is an extremely sensitive issue due to the human fatality aspect, yet, the crisis also presents an opportunity for nations to develop their healthcare resources for the future. The situation has forced countries to allocate their finite resources toward improving their healthcare capacity. This leaves majority of the world working in unison to concentrate their powers in producing extraordinary outcomes all due to the worldwide stress of the pandemic. It is quite possible that through this process, solutions will be found for not only COVID-19 but also for an array of other health issues that may arise.¹ Elon Musk has controversially labelled the pandemic as a ‘practice run’ for future viruses which raises the point that the world will be better prepared when similar scenarios occur.² Countries such as India, which hosts some of the world’s best engineering talent, have incorporated robotics into hospitals to minimise human-to-human contact.³

This is a fine example of how such rapid and intelligent improvement stems from disaster. It reinforces that diamonds are, in fact, made under pressure should the pandemic continue to act as a catalyst for medical advancement.

When the world is thrown a figurative curveball, mankind continues to overcome and adapt which only progresses our development. There is no debating that these disasters are terrible due to their destructive effects on lives, the environment, and the economy. However, these challenges enable us to advance as we escape our comfort zone and find ways to improve our living standards. So, if COVID-19 has you feeling down, maybe it’s your time to see the opportunity and get your innovator hat on.

Gabriel is a final year Bachelor of Economics and Bachelor of Commerce student. In his spare time, he participates in Powerlifting and Bodybuilding as well as operating his start-up business.



Image: <https://pxhere.com/en/photo/537392>

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Why the end of the world matters

Harrison George Power

How have views on the end of the world impacted morality and political organisation?

Imagine the world was ending tomorrow. What would you do differently today? Eschatology, the philosophy of the end of the world, is concerned with understanding the destiny of humankind. My aim here is to trace the origins of some modern eschatologies and demonstrate some of the implications they have for ethics and politics. We will begin with a traditional Christian eschatology to demonstrate the connection this has with political action. Then we will look at three other schemes. The first is a Christian spinoff from the Middle-Ages, while the other two originate after the 'enlightenment'. The first is from Comte, the second from Karl Marx.

The traditional Eastern Orthodox Christian eschatological view is that at an unknown "Judgement day" in the future, Christ will return. Not as a humble carpenter but as the Conqueror of death Himself. After Judgement day, a new eternal kingdom will begin. According to this eschatology, this is a spiritual kingdom, not an earthly one. Some of the implications of this view are found in St. Augustine's work, 'The City of God' (426 AD). In it, he explains that with Christ's resurrection, history is done and dusted and we are now just waiting for Judgement day. In his estimation, there is no higher earthly state that can be reached, and hence the notion of progress is absurd.¹ From a modern point of view, this is rather pessimistic if not outright blasphemous.

But what does this view mean for political action? Christ, when discussing Roman taxes, says "Render unto Caesar what is Caesar's and render unto God what is God's"². There is no call to revolution to install a Christian Theocracy. In fact, the view typically espoused is that the political system a Christian finds themselves in must be reformed from the inside. This is not a call to apathy for events in the world, but more a call to remember their secondary importance.

However, earthly events will take on greater importance as we jump ahead in history to the twelfth century and consider Catholic theologian³ Joachim of Fiore (1135-1202). He viewed

earthly history as being divided into three ages, corresponding to the three Persons of the Trinity. First: the age of the Father, characterised by the Mosaic laws of the Old Testament. Then, the age of the Son: characterised by the Catholic Church. And finally: the age of the Holy Spirit, a contemplative utopia where the institution of the Church is superseded by an order of universal love. In this third age, traditional hierarchies will no longer be needed, the Church and Monarchies will become unnecessary. And only in this third age will we be able to truly understand God.⁴ This is in stark contrast to the traditional view of Augustine, who thought of an earthly utopia as nonsense.⁵

One of the many groups that adopted or adapted his thinking was the Flagellants. In preparation for Joachim's third age (which was predicted to begin in 1260 AD), they walked around their medieval towns in sackcloth proclaiming the end was nigh and whipping themselves. They viewed the Catholic Church as corrupt and the Church's hierarchical structure as separating the people from God. In 1259 AD, a procession of thousands of peasants, swept up by the preaching of the flagellants, marched down the streets of the Italian city of Perugia. This crazed mob, who thought that the age of the Spirit was upon them, killed Catholic priests and Jews, acts which they thought would hold them in good stead in the utopia to come. This demonstration and the many future ones like it have been attributed to the teaching of Joachim.⁶

Moving forward several centuries, we arrive at Auguste Comte (1789-1857), the father of positivism. He, like Joachim, divided history into three stages: theological, metaphysical and finally positive. The theological stage is where most people are religious, observable phenomena are attributed to God and priests are the moral leaders. In the metaphysical stage, there is a shift from belief in a personal God to an impersonal god of metaphysics. Here, philosophers usurp the priests as spiritual advisors. Finally, we arrive at the positive stage. In this stage, all superstition and philosophy is done away with

¹ From the chapter on Augustine in Karl Lowith's 'Meaning in History' pp.160

² Matthew 22:21

³ Note that in 1054 AD the Eastern Orthodox Church split from the Roman Catholic Church.

⁴ From chapter on Joachim Fiore in Norman Cohn's "Pursuit of the millennium" pp.126

⁵ Joachim's Work was later refuted by Thomas Aquinas

⁶ From 'Cows, Pigs, Wars and Witches' by Marvin Harris pp.228

in favour of empirical observation and facts and God has finally been replaced by Science. It is in this stage where the scientist supersedes both the priest and philosopher.¹ Morals are no longer handed down by God or devised by erudite thinkers but are subject to the scientific method. There is still hierarchy but it will be purely meritocratic. Comte even formulated a religion which should be adopted once all of society was at this final stage. Known as the 'Religion of Humanity,' it was described by Thomas Huxley as, 'Catholicism minus the Christianity.' Its motto was, "Love as a principle and order as the basis; progress as the goal." Comparing Comte's to Joachim's scheme, we see in both a linear development from one historical stage to the next. With Joachim, it is the development of our understanding of God. With Comte, it is the development of our understanding of science.

Marx's (1818-1883) eschatology is also tripartite. First is primitive communism, a time where everyone lived in small hunter-gatherer tribes that, crucially, were classless. Then we have class society, the emergence of more complicated hierarchical societies and capitalism. Finally, we have communism. This is a utopia on earth where we have the classless society of the primitives but also all the advanced technology and ideals of more modern times. What distinguishes the views of Comte and Marx is that Comte believed his final stage would come about peaceably, and hierarchy would remain intact. Marx, of course, foresaw an apocalyptic revolution which would bring about his communist utopia.² For him, Judgement day is not Christ returning from the heavens, but the proletariat masses rising from the depths of society. We can perhaps see Marx as an atheistic Joachim, who is concerned not with our knowledge of God or even science, but simply humanity's material comfort.

It is of note that both Marx and Joachim predicted the decline of hierarchy in their respective earthly utopias.

If with Comte, progress became a virtue, clearly with Marx or at least with his adherents in the twentieth century, it is the chief if not only virtue. Leon Trotsky wrote that, "The end may justify the means as long as there is something that justifies the end."³ Thus, extreme progressives are not 'immoral' or even amoral. They are, from their perspective, perfectly good and reasonable. With the Flagellants, massacre was justified because the end was nigh. But with the Bolsheviks, their justification was that the revolution was nigh.

When 'progress' - whether spiritual or material - becomes the highest virtue, whatever achieves progress is considered morally good. Virtues, such as honesty or mercy, are no longer good in and of themselves, but are merely tools which are good or bad based on whether they contribute to 'progress'. When this view is coupled with a view that the utopian age is imminent, it can lead to the view that the ends indeed justify the means. Thus violence and terror can be morally good and to idly stand by or even question such methods is rendered immoral. "The evil," as conservative writer Juan Denoso Cortes puts it when discussing utopianism, "is not in the illusion; it is in the fact that, precisely on the moment and hour the illusion would be believed by all, blood would flow even from the hard rocks and earth."⁴ Ironically, it appears that in trying to bring about utopia, we have truly consigned ourselves to the end of the world.

Harrison George Power is a Monash University economics student with interests in history, theology and mathematics.

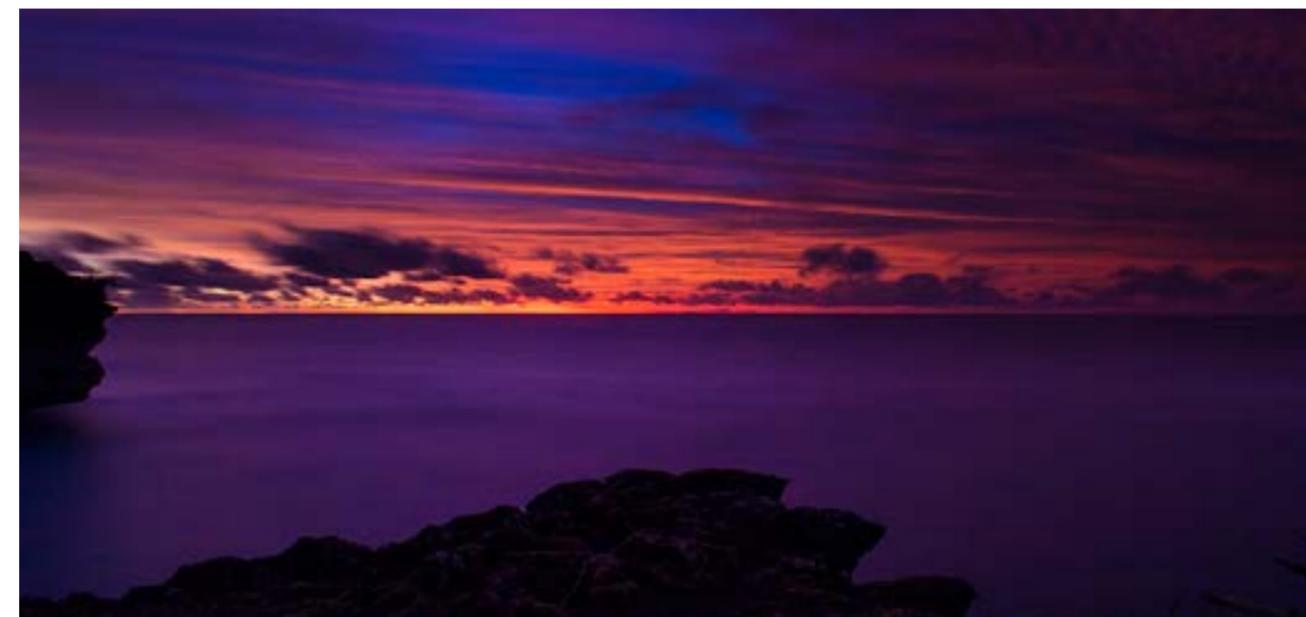


Image: https://commons.wikimedia.org/wiki/File:Purple_Sunset_Seascape.jpg

¹ From chapter on Comte in Karl Lowith's 'Meaning in History' pp.67

² From Chapter on Marx in Lowith's book

³ From, Their Morals and Ours: The Class Foundations of Moral Practice

⁴ From his work, Essays on Liberalism, Socialism and Catholicism.

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