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Authors	Mintz-Woo, Kian;Dennig, Francis;Liu, Hongxun;Schinko, Thomas
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POLICY ANALYSIS ARTICLE

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Carbon pricing and COVID-19

Kian Mintz-Woo [a,b], Francis Dennig [c], Hongxun Liu [b] and Thomas Schinko [d]

[a]Philosophy and Environmental Research Institute, University College Cork, Cork, Ireland; [b]University Center for Human Values, Princeton School of Public and International Affairs and Princeton Environmental Institute, Princeton University, Princeton, USA; [c]Yale-NUS, Singapore; [d]Risk and Resilience Program (RISK), International Institute for Applied Systems Analysis, Laxenburg, Austria

ABSTRACT

A question arising from the COVID-19 crisis is whether the merits of cases for climate policies have been affected. This article focuses on carbon pricing, in the form of either carbon taxes or emissions trading. It discusses the extent to which relative costs and benefits of introducing carbon pricing may have changed in the context of COVID-19, during both the crisis and the recovery period to follow. In several ways, the case for introducing a carbon price is stronger during the COVID-19 crisis than under normal conditions. Oil costs are lower than normal, so we would expect less harm to consumers compared to normal conditions. Governments have immediate need for diversified new revenue streams in light of both decreased tax receipts and greater use of social safety nets. Finally, supply and demand shocks have led to already destabilized supply-side activities, and carbon pricing would allow this destabilization to equilibrate around greener production for the long-term. The strengthening of the case for introducing carbon pricing now is highly relevant to discussions about recovery measures, especially in the context of policy announcements from the European Union and United States House of Representatives.

Key policy insights:

- Persistently low oil prices mean that consumers will face lower pain from carbon pricing than under normal conditions.
- Many consumers are more price-sensitive during the COVID-19 context, which suggests that a greater relative burden from carbon prices would fall upon producers as opposed to consumers than under normal conditions.
- Carbon prices in the COVID-19 context can introduce new revenue streams, assisting with fiscal holes or with other green priorities.
- Carbon pricing would contribute to a more sustainable COVID-19 recovery period, since many of the costs of revamping supply chains are already being felt while idled labour capacity can be incorporated into firms with lower carbon-intensity.

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Carbon price; carbon tax; climate policy; COVID-19; emissions trading; green recovery

Introduction

There are many economic dimensions to the current coronavirus disease 2019 (COVID-19) crisis, but key ones include massive supply and demand shocks; equally massive expansion of public balance sheets due to ad-hoc support measures, economic recovery plans, and decreases in tax receipts; and low energy prices. While circumstances vary across the world, many regions face similar conditions. This unprecedented situation raises the issue of how to evaluate, or re-evaluate, policy options against the backdrop of such a crisis. This has particular implications for addressing climate change, given the urgency of achieving net zero emissions within the next few decades (IPCC, 2018).

CONTACT Kian Mintz-Woo kian.mintz-woo@ucc.ie; mintzwoo@princeton.edu

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It is imperative to determine which types of policy responses could help the world to 'recover better' or 'build back better', setting the stage for an economic recovery that, at the same time, contributes to tackling climate change.[1] This article focuses on the issue of carbon pricing and the relative costs and benefits of introducing a carbon price amidst such a crisis, as compared with under normal conditions.[2] Carbon prices can be reflected in price-based instruments such as carbon taxes, which usually set a fixed cost for each additional ton of carbon dioxide, and quantity-based instruments such as carbon emissions trading. Most of the considerations discussed in this article would apply to both types of carbon pricing.[3] The reason for the focus on carbon pricing is that other policy instruments for addressing climate change (such as renewable energy incentives, product efficiency standards, or R&D investment) do not interact with this crisis in the many ways that carbon prices do. Furthermore, carbon pricing is a tool recognized for its strengths both by economists and thought leaders (Akerlof et al., 2019; Baker et al., 2017; The Economist, 2020) and which is being implemented in many jurisdictions across the world (Narrasimhan, 2018).

In typical circumstances, introducing a carbon price offers environmental benefits in the medium- to long-term, but can be costly in the short-term, because, inter alia, introducing new taxes, or strengthening existing ones, tends to provoke political opposition and undermines private sector predictability during their introduction. In the unusual circumstances arising from the COVID-19 crisis, the costs and benefits look atypical, with the crisis conditions affecting the merits of introducing, or strengthening, carbon prices. *Low energy prices* decrease the perceived costs of carbon pricing to consumers and the policy's potential political costs; the simultaneous *supply and demand shocks* mean that the market is already suffering the costs of reorienting, thus facilitating the introduction of carbon prices; *fiscal pressures* make the case for revenue-positive carbon policy more valuable in the short-term; and *changes in production and consumption* could lead to greener economic activity if industries are encouraged to develop along the lines of long-term economic and environmental low-carbon sustainability. If the merits are affected in these positive ways, a carbon price could complement traditional fiscal efforts to stabilize and boost the economy, while strengthening efforts to combat climate change.

This input comes as a timely contribution, not only in the context of the COVID-19 pandemic, but also in the midst of international climate policy developments. In June, the United States (US) House Select Committee on the Climate Crisis (2020) issued a report which calls for a price on carbon. Furthermore, in May 2020, the European Commission presented a proposal for a €750 billion recovery plan to revive the bloc's economies that have been affected by the COVID-19 crisis (Brunsden & Fleming, 2020). The European Commission has committed to revising its Energy Taxation Directive in order to incentivize green behaviour, that is, to raise the price of carbon intensive energy (European Commission, 2019). At the national level carbon prices are under consideration in many other jurisdictions. Malliet et al. (2020), for example, find that, in France, carbon prices would stimulate green investment while not slowing the recovery from COVID-19. Against this background, this article seeks to explore whether the COVID-19 crisis provides a window of opportunity for the introduction of strong carbon pricing, with potential benefits both for economic recovery and for tackling climate change. This potential window is important to consider even if the ways in which public opinion and political bandwidth will evolve are especially difficult to predict given the unprecedented COVID-19 conditions.

The article begins by discussing the opportunities raised by low energy prices to help reduce the costs of carbon pricing to consumers. It then discusses the COVID-19 supply and demand shocks, arguing that the massive reorientation of supply chains means that some costs of increased carbon pricing are already being felt, with opportunities to lock in low-carbon behaviours. The article continues by drawing attention to the fiscal demands of COVID-19 and the urgent need for new sources of funding, which could include carbon pricing. Next, the article discusses a COVID-19 recovery period, where having a carbon price could incentivize firms that are sustainable for the long-term, both environmentally and financially. Finally, the paper concludes by attending to links to current policies under consideration and the limited time available for effectively tackling climate change.

Persistently low oil prices

In February and March of 2020, a price war between Russia and Saudi Arabia led to a glut of oil being dumped on the market by both countries. While an intervention by US President Donald Trump in April 2020 succeeded

in reducing production levels, the oil glut contributed to historically low price levels. The main driver of these low price levels, however, is demand reduction in light of restrictions on economic activity in response to COVID-19, with oil demand down nearly 5% in the first quarter of 2020 (International Energy Agency, 2020).[4] We should expect to see at least a short-term period where this demand – and oil prices – remain low; energy analysts expect oil prices to generally remain below US$40 per barrel 'for the foreseeable future' (Krauss, 2020). In September 2020, BP's annual energy outlook included two scenarios where demand never rises above 2019 highs (Raval et al., 2020). These drivers do not only apply to oil; given falling demand and gas storage approaching capacity, prices for natural gas are predicted by some analysts to even go negative (Stapczynski et al., 2020). Such low energy prices may provide an opportunity to introduce or strengthen carbon pricing policies, because they reduce the harm to the consumer relative to normal conditions.

One key political economy consideration in relation to low energy prices is how these translate into perceived costs on the consumer side (Maestre-Andrés et al., 2019), and the consequent repercussions for the acceptability of carbon pricing. There are different categories of consumer goods where changes in energy prices translate into lower prices for the consumer with greater or lesser transparency. In the highly transparent category, we have goods like gasoline, where changes in oil markets have a high correlation with end-user prices. In the moderate category, we have goods like electricity that are highly linked to oil prices. In the less transparent category, we have consumer goods produced with or from oil, like phones, food, etc. The political economy considerations in relation to carbon prices directly respond to the highly transparent category and perhaps to the moderate category; for most consumers, changes in prices to inputs to their consumer goods will be less salient.

As for the former categories, however, there can be significant opposition to carbon pricing from consumers who are concerned about rising costs (Klenert et al., 2018). Such concerns have proved to be a barrier to introducing carbon pricing at all, or to implementing carbon prices at high enough levels to have an impact on behaviour (Carattini et al., 2018; Rabe, 2018).

New or strengthened carbon pricing policies that would offset recently lowered prices – as experienced during the COVID-19 pandemic – are less likely to be objectionable to consumers. Carbon taxes, in particular, could even be used to stabilize oil prices and reduce volatility by offsetting price swings (Derviş & Strauss, 2020). The potential to take advantage of more muted opposition acts as a point in favour of introducing carbon pricing in the context of the COVID-19 crisis, especially if done quickly before consumers fully adapt to lower fuel prices.

Furthermore, while consumer demand for fuels is relatively inelastic under normal conditions (Labandeira et al., 2017; Woo et al., 2018), there is reason to believe that demand has become more elastic in the short-term in the COVID-19 context. One reason is that consumers are more likely to be able and willing to curtail their travel patterns, especially international air travel, which has seen a substantial fall in demand due to COVID-19 restrictions. Another reason is that, with uncertainty and shocks to consumer confidence there might be more price-sensitivity than normal. If this is correct, the impact of carbon pricing would fall more on producers and less on consumers than under normal circumstances. This follows from economic research on how increased taxes are carried by consumers and producers ('tax incidence'); roughly speaking, the side with the greater elasticity – responsiveness to changing costs – bears less of the burden since they can shift their buying or selling behaviour. Normally, consumers are relatively inelastic in energy use and producers are relatively elastic. In this context, increased elasticity amongst consumers would predict a greater burden of carbon prices falling on producers, at least relative to normal. This could help address costs, whether political or to the consumer. Insofar as demand is more elastic, this presents another advantage of introducing a carbon price now during the COVID-19 crisis.

Raising energy costs through a carbon price might also counteract the stimulus effect of low energy prices, which would otherwise encourage greater energy use (e.g. for leisure activities), and with it carbon emissions. Given that governments throughout the world are placing a high priority on economic recovery from the COVID-19 crisis, the potential dampening of any stimulus effect might seriously harm the political attractiveness of carbon pricing.

In this regard, there are two countervailing considerations. The first applies to some carbon-intensive activities. Private transport activities – especially international air travel – now carry additional negative externalities

in terms of increasing potential disease transmission. If we wish to slow and control the spread of the virus, disincentivizing transport and travel relative to the pre-pandemic status quo could bring significant public health benefits, while also lowering carbon emissions.

A second countervailing consideration against concerns about dampening the stimulus effect is that the COVID-19 context does not call for economic stimulus as such. The supply and demand shocks were not endogenous; they were primarily driven by governmental action. In the absence of the government restricting market activity, there is no reason to believe that demand would be low. Although the fiscal measures are sometimes called a stimulus in the press, they are not meant as financial stimuli; they are meant to ameliorate the pain of temporarily pausing economic activity. In this context, low prices by themselves would do little to increase market activity; instead, they would depress the income of producers and could trigger deflationary mechanisms by increasing savings rates. Therefore, in the context of the COVID-19 crisis, it is not clear that reducing the stimulating effect of low oil prices is a substantive point against a carbon price, as it might have been under different recessionary circumstances.

Finally, while low-carbon energy sources were becoming cost-competitive before the COVID-19 crisis[5] even on an unsubsidized basis, low oil prices now threaten to curtail low-carbon investment. Given the reduction in overall energy demand, the low- or no-variable cost renewable sources have, however, experienced resilient demand during the crisis (International Energy Agency, 2020). The extension of carbon pricing policies would not only help to internalize the externalities of carbon-intensive fuels, but also to maintain these longer term trends that favour renewables, especially given the consumption and production changes accompanying the COVID-19 shocks.

Supply and demand shocks

Reduced production in many parts of the world was the initial response to the COVID-19 crisis, with factories across first China, and then across the world, being shuttered (Edgecliffe-Johnson, 2020); this led to massive supply-chain shocks and attempts to reduce exposure to particular suppliers (Wolf, 2020). This reduction was made more challenging by the predominance of just-in-time value chains which traded redundancy for efficiency (McKinsey, 2020).

These production responses have been accompanied by massively reduced consumption. Some of this consumption has been curtailed by government requirements to stay at home; some is due to loss of wages and some due to precautionary saving (Rogoff, 2020). This demand shock can be felt in many sectors of the economy, but for the purposes of this article, our questions are how to orient the overall mix of firms towards lower carbon-intensity and whether these shocks undermine, or perhaps support, the political feasibility of a carbon price.

Carbon pricing directs support to firms providing low-carbon products and services and away from those that are carbon-intensive. In this sense, expanding or strengthening carbon pricing would provide a low-carbon direction to the creative destruction (Schumpeter, 1942) occurring because of both the supply and demand shocks. Government support, however, is being requested, and indeed given to, many carbon-intensive industries; insofar as they have political clout, this could make introducing a carbon price during the COVID-19 crisis more difficult.[6]

However, Hepburn et al. (2020) find that bailing out carbon-intensive sectors like airlines is believed to come with very low long-term multipliers – that is, the value of spending on these priorities in terms of ratio of change in national income to the government spending is low. In a survey of economic experts in both the public and private sectors, Hepburn et al. (2020) find that airline bailouts were consistently ranked as the least valuable recovery policies in the long-term. Although it might be challenging politically in the short term to avoid supporting carbon intensive industries, we can expect that supporting such firms will be more costly for the government since the return on government spending is relatively low. In contrast, Hepburn et al. (2020) find that spending on some 'climate positive' priorities would generate *both* sustainable environmental and economic benefits, with larger long-term returns to national income. The five climate-positive priorities they recommend are clean infrastructure, building efficiency retrofits, natural

capital for ecosystem resilience, clean R&D investment, and training for employment transitioning from carbon intensive sectors.

On the consumer side, one could be concerned that the shocks induced by COVID-19 may have led to the displacement of concern about climate change, and therefore greater difficulty in introducing carbon pricing policies. However, an April 2020 survey across 14 countries found 71% globally agree or strongly agree that climate change in the long term is as serious as COVID-19 (21% disagree or strongly disagree) while 65% support or strongly support a green recovery from COVID-19 (25% disagree or strongly disagree) (Ipsos MORI, 2020). Those surveyed probably disagreed about how to understand a 'green recovery', but it is plausible that green recoveries broadly include incentivizing green activity and disincentivizing carbon-intensive activities, which would be the purpose of carbon pricing policies. The same survey also found that, if a political party did not have serious climate policies, 57% would be put off voting for that party (with 15% disagreeing or strongly disagreeing). Interestingly, 51% said they believed that it was somewhat or very likely that COVID-19 would increase *other* people's motivation to address environmental concerns. This evidence suggests that the COVID-19 crisis has not undermined people's political, economic or social support for strong climate action, thereby potentially offering a window of opportunity to introduce effective carbon pricing. While this opportunity is important to recognize, it may crucially depend on the shape of the carbon pricing policy, especially how revenue is used and whether it is transparently allocated to addressing the costs of COVID-19.

Potential revenue during the crisis

The demand shock also raises fiscal concerns; OECD countries are expected to face trillions in public debt due to the coronavirus, $17tn by one estimate (Giles & Harding, 2020). Budgets have been hit both by greater use of social safety nets as well as by decreased tax revenues. Besides automatic stabilizers such as unemployment insurance, all G20 nations have also adopted massive fiscal measures to inject liquidity and try to address lost wages.

In the short-term, a carbon price would raise revenue, presenting possibilities with different strengths and weaknesses. Uses of carbon revenue which involve government spending, whether for green or other policies (revenue-positive) can be distinguished from revenue which is simply returned to taxpayers, either directly as lump-sum payments or by reducing other taxes (revenue-neutral).[7] Of course, combinations of these uses of revenue are possible and have been implemented. Insofar as the policy is revenue-positive, that could help counterbalance the fiscal shortfalls that many governments will face. For instance, in the US, where state governments are legally unable to run deficits but face major fiscal demands in response to the crisis, a new source of revenue could be particularly welcome (Galbraith & van den Bergh, 2020). In the EU, additional revenue streams for covering the repayment and interest costs for the recovery plan are also currently being considered. The amounts that could be raised by a carbon tax are not insubstantial. In 2019, when the US was associated with 4.8GtCO_2 in energy-related emissions, a carbon tax of $40/t$CO_2$ could theoretically have yielded $192bn. The contributions that such revenues could make to addressing fiscal shortfalls are significant. The US Select Committee on the Climate Crisis (2020) makes the point that such revenues could be used for other green priorities such as creating an energy supergrid, improving the rail options, and providing support for workers in vulnerable sectors like coal mining (for a survey of such potential transition policies, see Green & Gambhir, 2020). This capacity to allocate funding to other low carbon initiatives could be a point in favour of introducing revenue-positive carbon taxes during COVID-19 crisis conditions.

However, distributional considerations support returning at least part of the revenue to the population directly to offset the potentially regressive nature of carbon taxes.[8] Even in regions where these taxes are only slightly regressive, moral considerations support using some of the revenue to at least neutralize any negative impact on low income households (Sayegh, 2019; Singer & Mintz-Woo, 2020). Making the incidence of carbon taxes progressive, or at least neutral, is not difficult to achieve; given simple equal per capita lump-sum transfers, the net distributional effects of a tax and dividend scheme would be progressive (Cronin et al., 2019; Mathur & Morris, 2014; Pizer & Sexton, 2019; Williams et al., 2015).[9] Aside from the distributional benefits, lump-sum transfers were, for example, also helpful in building a supportive constituency for the

British Columbian carbon tax (Harrison, 2012) and made it amongst the most supported designs in a Swiss choice survey experiment (Carattini et al., 2017). It is worth noting that alternative uses of these funds could have greater welfare benefits by reducing distortionary taxes, such as labour taxes, although it is plausible that these uses of revenue should be dispreferred to those which decrease regressivity and increase political acceptability (Klenert et al., 2018; Maestre-Andrés et al., 2019). In the context of the COVID-19 crisis, fiscal imperatives have to be weighed against these distributive concerns, raising the opportunity cost of using carbon tax revenue to redress regressivity. However, to the extent that we favour policies that distribute resources to the worst-off in response to the crisis, there may be even stronger reasons to favour equity over efficiency now.[10]

Towards greener consumption and production

The long-term goal of a carbon price is to shift away from carbon-intensive production and consumption. This will require investment and R&D, which are much more challenging for both the private and public sectors to raise during an economic crisis. The key here is that prudent and required measures to avoid potential vectors of COVID-19 infection have already triggered major changes in behaviour; intervening now by introducing measures like carbon prices may drive social systems into new equilibria with more widespread low-carbon norms (Aghion et al., 2016; Farmer et al., 2019).

On the demand side, for example, the COVID-19 crisis has driven major reductions in individual mobility, along with complementary shifts to less carbon-intensive practices like cycling and telecommuting (Conger, 2020; Goldbaum, 2020; Herman, 2020).[11] Synergies with infrastructure change, such as widening cycle lanes and changing parking spaces to pedestrian pavement, could encourage these low-carbon behavioural changes to continue (Keohane & Abboud, 2020). However, these trends could be fragile; in the absence of sufficient carbon pricing policies, we may return to a market where sport utility and other high emission vehicles are in high demand (Helm, 2020).

On the supply side, The Economist (2020) reports that 'businesses at the heart of the fossil-fuel economy – oil and gas firms, steel producers, carmakers – are already going through the agony of shrinking their long-term capacity and employment'. In this context, some costs of reorienting carbon-intensive production have already been incurred (also cf. Rosenbloom & Markard, 2020). This is a significant consideration in favour of adopting a carbon price now; in normal circumstances, idling productive capacity would be a major cost – this is less of an issue when productive capacity is idle and for good reason. As recovery brings increased production, adopting less carbon-intensive processes – as incentivized by a carbon price – would be easier than they would be if there had been no retrenchment.

Finally, another consideration in favour of introducing a carbon price now is that, during a recovery, there will be significant amounts of spare labour capacity, which could be put to productive use. With an effective carbon price in place, such use would be less carbon intensive. Crucially, it is easier to form new less carbon-intensive firms than it is to shift extant firms to less carbon-intensive production modes. This is complemented by the fact that low-carbon investment (e.g. building refurbishment, renewable energy source investments) tends to be labour intensive and foster local value chains, which makes it more politically attractive. Creative destruction unfolds through the churn of companies failing and new ones forming with those resources. A carbon price can have an important effect in pushing for a greener economy by incentivizing the direction of this churn. During the crisis, a carbon price helps direct support to low-carbon firms. In the recovery phase, it could help create new low-carbon firms to replace older carbon-intensive ones.

Conclusion

The COVID-19 crisis presents challenges, but also opportunities. In particular, the EU's Green Deal should be implemented in such a way that it boosts economic recovery while putting the EU on a low-carbon pathway. While such a policy is not on the horizon in the US under a Republican controlled administration, the US may well be still managing the COVID-19 crisis into a new administration.

The COVID-19 crisis teaches us to put policies in place to try to curb environmental risks before they strike. If these opportunities are missed and massive fiscal stimulus measures are targeted at carbon-intensive industries and consumer goods, we will experience more technological high-carbon lock-in for the next decade or decades. The introduction or strengthening of carbon pricing would, instead, help redirect the recovery towards a low carbon future. In the context of the limited timing we have available to green our production and consumption (Goulder, 2020), the COVID-19 crisis is, perhaps surprisingly, the ideal time to introduce carbon pricing more broadly to incentivize a more sustainable future.

Notes

1. UN climate change news, 4 May 2020. https://unfccc.int/news/support-grows-for-a-better-recovery-from-covid-19.
2. In regions where fossil fuels are subsidized, parity of reasoning suggests that the subsidies should be withdrawn and the same arguments for introduction of a carbon price apply, albeit with greater force (Basri et al., 2020). Such counterproductive subsidies have not been limited directly to fossil fuels. They include subsidies that apply to, for instance, housing and commuting.
3. For a review of quantity-based instruments, see Narassimhan et al. (2018). For a discussion of relative costs and benefits between these systems see Haites (2018).
4. As Helm (2020) notes, the oil glut that precipitated the price crash during the COVID-19 crisis, when prices even turned negative in some cases, occurred before many of the economic effects of the crisis were felt. Low energy prices are therefore partially independent of the demand shock.
5. See, for instance, the levelized cost of energy estimates at https://www.lazard.com/perspective/lcoe2019.
6. Government support in recovery packages can be found at https://www.energypolicytracker.org/. Thanks to the editor for pointing to this source.
7. While the discussion here tracks carbon taxes, similar considerations apply to emissions trading schemes. They are less discussed because the political pushback against emissions trading scheme revenue is lower than for carbon taxes – trading schemes are less likely to be seen as taxes on consumers, even if they do have the effect of raising energy prices (Rabe, 2018). On the emissions trading schemes side, Narassimhan et al. (2018) discuss various uses for trading scheme revenues. They discuss three categories: supporting emissions-intensive and trade-exposed sectors, funding green projects, and supporting distributional equity. While they do not pronounce on the relative merits of these different uses of trading scheme revenues, similar considerations and comparisons to those given here could be adduced.
8. Pizer and Sexton (2019) point to different national characteristics indicating that the tax incidence depends on both the region and the form of energy is being taxed. For instance, with respect to transportation fuel taxes, the direct impacts of these taxes could be progressive in Turkey, where car ownership is heavily weighted by wealth.
9. This simple transfer scheme also has the political benefit of being promoted by prominent conservative thinkers (Baker et al., 2017).
10. Thanks to Ewan Kingston for suggesting this line of reasoning.
11. Of course, we also see preferences for use of private transportation instead of public transportation, due to fears over virus transmission. In a recovery period where oil prices may rebound, carbon prices could add to the opportunity costs of using private transportation with fossil fuels. Incentivizing purchases of electric vehicles, for example, could have significant value in reducing emissions, regardless of region (Knobloch et al., 2020).

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ORCID

Kian Mintz-Woo http://orcid.org/0000-0002-9216-9561
Francis Dennig http://orcid.org/0000-0001-7362-1009
Thomas Schinko http://orcid.org/0000-0003-1156-7574

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