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Reducing inequality and carbon footprints within countries

Dario Kenner, February 2016

A response to the report, **'Carbon and inequality: from Kyoto to Paris'** by Thomas Piketty and Lucas Chancel (Paris School of Economics, November 2015).

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Summary

To date there has been a lot of focus on comparing the size of countries' greenhouse gas emissions. Interest is now growing in exploring the links between individual's carbon footprints and today's extreme inequality within countries.

In this article I make some initial comments on Thomas Piketty and Lucas Chancel's recently published report which highlights the unequal distribution of carbon footprints across different income groups. My emphasis is on the carbon footprint of the richest 1% because I believe this should be the priority for future research and is why I wrote my working paper on this subject area. However, given the scale of the problem it is clear action is needed across society to reduce greenhouse gas emissions.

I focus on the United States because this is the country where Piketty and Chancel found the richest 1% have the highest per capita carbon footprint. I discuss the implications of their findings of extreme carbon inequality in the United States and the difficulty in effectively reducing the carbon footprint of the richest 1% via measures such as carbon taxes.

I then offer some initial thoughts on how measures that aim to reduce inequality can be designed to ensure they also factor in carbon footprints. I do this by exploring how policies to redistribute wealth could potentially increase or decrease an individual's carbon footprint.

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1 Beyond per capita footprints: Time to look at responsibility for environmental impact within countries

Piketty and Chancel highlight "the unequal contributions to pollution" and argue it is "crucial to focus on high individual emitters rather than high emitting countries". They estimate that the top 10% emitters in different countries around the world contribute to 45% of global emissions.

I fully agree with this focus and this is one of the core messages of my working paper. Whilst it is crucial to compare the total carbon footprints of each nation, to identify where unsustainable production and consumption patterns are concentrated globally, for too long debates have revolved around these national level statistics which hide the inequality of consumption of fossil fuels within countries.[1]

2 What is the carbon footprint of the richest?

The scale of action needed to tackle climate change requires reductions in carbon footprints across society in many countries, in particular countries in the global north. My focus in this article is on the carbon footprint of the richest and the difficultly in reducing their footprint as one way to reflect on the challenge of ensuring all income groups take action to tackle climate change. In my working paper I argue that given current levels of inequality it is crucial to quantify the environmental impact of the richest as it is likely they have large footprints (this is based on my analysis of household expenditure surveys from the United States, Japan, China, United Kingdom and France). This assertion is confirmed by Piketty and Chancel's data.

Instead of looking at emissions from production (such as factories and extractive industries) Piketty and Chancel choose to look at those associated with consumers (referred to as consumption based emissions) with a particular emphasis on indirect emissions from "the production, transport, trade and sale" of goods and services such as food and hotels. Using a methodology based on a variety of national data covering the period 1998-2013 they identify a strong correlation between higher income and higher carbon footprint.[2] For example, they estimate that in 2013 the "top 1% richest Americans, Luxemburgers, Singaporeans and Saudi Arabians are the highest individual emitters in the world, with annual per capita emissions above 200tCO^2e".

2.1 What is the carbon footprint of the richest 1% in the United States?

Piketty and Chancel estimate that the country where the people making up the richest 1% have the highest per capita carbon footprints is in the United States. They estimate that in 2013 the average emissions per person of the richest 1% (3.2 million people) was around 318 tonnes of CO^2e. In comparison the average emissions per person of the poorest 10% (around 31 million people) was around 3.6 tonnes of CO^2e.

Table 1: Consumption based CO^2e emissions per capita by income decile in the United States in 2013

United States	Income deciles	Population of income decile (million)	CO^2e emissions (tCO^2e per capita)
Poorest	10%	31.6	3.6
	10%	31.6	7.1
	10%	31.6	9.7
	10%	31.6	12.2
	10%	31.6	14.8
	10%	31.6	17.6
	10%	31.6	21.1
	10%	31.6	25.6
	10%	31.6	32.6
	9%	28.4	58.5
Richest	1%	3.2	318.3

Source: Piketty and Chancel, 2015.

Piketty and Chancel's data shows this unequal distribution of greenhouse gas emissions has deepened over the last 15 years. The only income group which saw their carbon footprint increase between 1998 and 2013 was the richest 1% who saw their average annual emissions per person rise from 289 to 318 tonnes of CO^2e (in 2008 it was 361 tonnes of CO^2e per person which probably fell by 2013 because of the financial crisis). Meanwhile the remaining 99% saw their average annual emissions per person fall slightly over the period 1998 to 2013.[3] This applies to all of the 99% although clearly there are significant differences in the size of footprint that fell (see Table 1).

It is interesting to note that carbon inequality got worse in the United States at the same time as income and wealth inequality dramatically increased, most notably in the hands of the richest 1% (Stiglitz, 2011; Piketty, 2014). Therefore it would appear there is a link between rising inequality and carbon inequality but more research is needed to explore this relationship (Dolan, 2016).

Piketty and Chancel's data raises a related issue: are the richest 1% more carbon efficient than other groups such as the poorest 10%? It has been suggested that while the richest people hold more wealth (in 2010 the richest 1% held around 36% of wealth in the United States) their carbon footprint does not "keep pace with their wealth" because they do not spend all of this wealth in ways that increase their greenhouse gas emissions (Pearce, 2012).[4] The underlying argument here is that if everyone becomes richer they will become more carbon efficient.[5] More research is needed to test this theory further.

However, is this a priority? Scientific research (IPCC, 2014) combined with extreme weather events such as hurricanes, flooding and drought around the world makes it clear climate change is a vital issue that needs to be dealt with urgently. Given this reality it could be argued the objective should be to reduce total national carbon footprints instead of being distracted about who is most carbon efficient in relative terms. Therefore what matters is that the richest people have much higher carbon footprints per person (e.g. this applies whether you focus on the top 1%, 10% or 20% in the United States as the table above shows) and these should be reduced. There is simply not enough time to test out the theory of everyone else getting richer and more carbon efficient because drastic emissions reductions are needed over the next 10-15 years, particularly in the global north (UNEP, 2015).

2.2 Reducing carbon inequality in the United States

One way to react to seeing that the richest 1% emit so much more per person is to say that this is not fair and should be more evenly distributed within the population.[6] However, in the global north, as well as some emerging economies, the goal can no longer be just to resolve carbon inequality. This is because countries such as the United States are currently in overshoot, defined as "when humanity's demand on nature exceeds the biosphere's supply, or regenerative capacity" (Global Footprint Network, 2015). As the second larger emitter in the world, and the biggest emitter historically, this is particularly the case in terms of carbon emissions (World Resources Institute, 2015; WWF, 2014). This means that currently total greenhouse gas emissions in the United States, whoever is responsible, are unsustainable in the long-term and need to be reduced. This fact is reflected in the new global agreement on climate change agreed in Paris in December 2015 where the United States committed to reducing its greenhouse gas emissions (UNFCCC, 2015).[7]

The reality is that US citizens across all income groups will need to reduce their emissions. For example, Oxfam research estimates the bottom 40% of the population in the United States emit more than the richest 10% of people in countries such as China, India and Brazil[8]. While action needs to be taken across society I believe Piketty and Chancel's data highlights that the immediate priority should be to target the richest 1%. This will not be straightforward. In my working paper I identify several issues that need to be addressed if the richest are to be successfully made to reduce their carbon footprint.[9] Given that climate change affects all of us there needs to be an open public debate, with the participation of experts and non-experts, about what will make the richest actually reduce their carbon footprints.[10]

I have chosen to focus on the United States because this is the country where Piketty and Chancel estimate the richest 1% have the highest per capita carbon footprints. Their data shows that in other high emitting countries such as Australia, Canada, China, France, Germany, Mexico, India, Indonesia, Russia, Saudi Arabia, Japan and United Kingdom the richest 1% (in each of these countries) have much higher average per capita CO^2e emissions. Whilst acknowledging the diversity of national contexts it is clear the issues discussed above are relevant to a number of countries.

2.3 Carbon taxes

In response to their finding of carbon inequality within countries Piketty and Chancel propose a global progressive carbon tax. The tax would target those with the highest carbon footprints (whether they live in developed or developing countries) and the €150 billion a year raised in revenue would finance projects to adapt to the impact of climate change, which are currently under-funded. They present three options to implement the global carbon tax under which individuals would contribute in proportion to the size of their carbon footprint:

1) Target the top 28% of emitters - anyone who emits above the world average emissions of 6.2 tonnes CO^2e per year.

2) Target the top 10% of emitters in the world - individuals who emit more than 2.3 times the world average.

3) Target the top 1% of emitters - individuals who emit more than 9.1 times the world average.

Piketty and Chancel's proposal is a useful contribution to the debates on how to ensure the highest emitters are targeted wherever they live.[11]

Would carbon taxes reduce the carbon footprint of the richest 1%?

I now discuss what the impact of a carbon tax would be in practice. Given the large carbon footprint per person of the richest 1% I will focus here on how a carbon tax would affect their carbon footprint. While carbon taxes are likely to have an effect (and could generate significant revenue as Piketty and Chancel suggest) there is a lack of research on the extent to which these types of taxes have directly led to a reduction in fossil fuel consumption by the richest. Instead the main focus has been on whether environmental taxes are progressive or regressive (e.g. Flues and Thomas, 2015; Chiroleu-Assouline and Fodha, 2014; Preston et al., 2013; Ekins et al., 2011) based on the fact the poorest often spend a larger proportion of their wealth on energy (Sterner, 2012).

The question that needs further research is: Will carbon taxes make the richest 1% drastically reduce their huge carbon footprint by the quantity needed? (i.e. in the countries mentioned above they emit a lot more per person than the income deciles below them). The reason this question needs to be explored is because while carbon taxes would indeed make the richest 1% pay more to consume fossil fuels, they could use the income generated from their existing wealth to cover this cost.[12] Given inequality is deepening in countries such as the United States and the wealth of the richest 1% is growing (Piketty has shown the rate of return on wealth is rising faster than the rate of economic growth) a related question is whether the richest would be able to afford the increased costs of carbon taxes indefinitely.

The continuing drought in California may provide an insight into how the richest 1% might behave. In the affluent area of Montecito there are reports that some of the super-rich responded to mandatory cuts to save water by using their wealth to pay millions of dollars in fines to continue to use vast amounts of water (Bardach, 2014), or paid above market rates to have water delivered from other areas (Deprez, 2015; Allen, 2014).

One way to take forward research on how the richest 1% might react to a carbon tax would be to look at whether they would increase or decrease their carbon footprint if fossil fuel subsidies were removed or reduced. They might not result in the richest radically reducing their fossil fuel consumption as they are prepared to pay more (Giugale, 2015). To date research indicates that the richest benefit more from these subsidies than the poorest (IMF, 2013) because they use more energy (APEC, 2012). Therefore, while the removal of subsidies would make the rich pay more for their carbon footprints it is likely their removal would hit the poorest hardest (ODI, 2015).[13]

3 Factoring climate change in to policies that aim to reduce inequality, and vice versa.

I now move to a related subject by offering some initial thoughts on how policies that aim to reduce inequality could be designed to ensure they also factor in carbon footprints.

There is growing public pressure for governments to take action to reduce extreme inequality. This pressure is only likely to continue given that the richest 1% now hold more wealth than the poorest 3.6 billion people combined (Oxfam, 2016).[14] At the same time greenhouse gas emissions need to be reduced to tackle climate change, and governments around the world have committed to doing this at the Paris climate change summit in December 2015 (UNFCCC, 2015).

It will not always be possible to implement policies that would tackle both inequality and carbon footprints. This should not stop efforts to tackle either issue. If a policy such as limiting car use was successful in reducing carbon footprints but did not alter existing income inequality it should clearly still be implemented. My point is that as far as possible governments should attempt to address both issues. For example, when governments introduce measures to reduce citizen's carbon footprint they should acknowledge existing extreme income and wealth inequality (e.g. as discussed above the richest 1% might be able to ignore a carbon tax if it was not high enough because they are so wealthy), and also carbon inequality as highlighted by Piketty and Chancel's report.

And when governments are adopting policies to reduce inequality such as redistribution they should factor in the consequences on carbon footprints. A question that needs further research is:

How to ensure that policies to reduce inequality would also reduce total national greenhouse gas emissions?

What would happen if the government in the United States redistributed wealth via increased taxes on the richest? There is currently an unequal distribution of disposable income[15] (the share of the richest 10% is around 33% compared to the poorest 10% who hold just 0.9%) with the result that this "wealth gap fragments the US consumer market and limits the outgoings of large numbers of poorer citizens" (Euromonitor, 2015). In theory if the poorest, and to a certain extent the middle class, received additional income this could mean they increase their carbon footprints via direct emissions (e.g. they travel more by car and planes, they use more energy in their homes) and indirect emissions (e.g. they purchase more electronic goods, clothing, meat and imported food).

In a response to my working paper Alex Cobham notes that: "it is quite possible, indeed plausible, that substantial redistribution may succeed in raising the consumption and footprint of lower-income beneficiaries...this is broadly consistent with the observed higher marginal propensity to consume of lower-income households. In such a scenario, inequality reduction could well exacerbate (over) consumption. Exacerbating this, if inequality also hinders economic growth as the weight of research now suggests, (over)consumption possibilities at the national level may also be expanded by redistribution." (Important debates continue on the links between inequality and economic growth.[16])

On the other hand perhaps those individuals who received additional income would now be able to afford "green" goods and services which could mean their carbon footprint would be reduced. This is based on the assumption that the richer you are the more able you are to substitute carbon intensive goods with environmentally friendly goods (Berthe and Elie, 2015). For example, they might now be more able to purchase goods that are more energy efficient or have a longer life span meaning they have a smaller carbon footprint over the long-term e.g. in the United States electric cars are more expensive[17]. (What matters here is that an individual reduces their total footprint.[18])

Another possibility is that instead of spending their additional income individuals choose to save it either by holding money as cash, in a deposit account or as an investment. Would this automatically mean redistribution would not lead to an individual increasing their carbon footprint i.e. by saving their additional income instead of flying more? At the moment we do not know. For example, if this money was invested then it would depend on the carbon footprint of the investments but this is currently very difficult to calculate[19]. (Given that often the richest have large savings a related question is how the size of the carbon footprint of the richest would be affected by redistribution.[20])

3.1 Policy design

To ensure that policies that aim to reduce inequality also factor in carbon footprints more research is needed on the possible consequences of redistribution discussed above. As part of this we need to understand how different policies to reduce inequality affect an individual's carbon footprint. Thomas Piketty has discussed the implications of implementing efficient redistribution (e.g. taxes) or pure redistribution (e.g. increasing the minimum wage) in relation to economic issues such as: Capital/Labour substitutability, the cost of labour, and the stock of capital (Piketty, 2015). What is needed now is to explore how these different types of redistribution would affect an individual's carbon footprint, for example:

- Sales taxes on green goods: Oxfam's latest report on extreme inequality calls on governments to shift the tax burden away from consumption towards wealth and capital (Oxfam, 2016). One way to do this would be to reduce sales taxes such as VAT. Would this lead the poorest groups, and to some extent the middle class, to increase or decrease their carbon footprint? Could reducing sales taxes on expensive "green" goods and services increase demand for them? More research is needed on how different levels of sales taxes on energy-saving goods and services in the European Union (20%) and the United Kingdom (5%) have affected the amount of these products purchased by different income groups.[21] Another area to explore further is which income groups benefit most from sales tax reductions. For example, a study indicates that in the United States between 2002 and 2012 it was the richest people who benefited most from federal tax credits to install domestic solar panels and purchase hybrid or electric vehicles (Sparshott, 2014).
- Weightless redistribution: If a government gave the poorest individuals a lump sum at a specific age (e.g. a citizen's income) or regularly (e.g. conditional cash transfers) would this lead to an increase or decrease of their carbon footprint? Using the same principle of local currencies - where spending is restricted to local goods and services - could a portion of this transfer be given in the form of a token[22] meaning it had to be spent on "green" goods (e.g. electric cars and organic food) and services (e.g. entertainment, training workshops and community groups), or invested in "green" infrastructure (e.g. renewable energy, recycling centres)?

Conclusions

Interest is growing in exploring the links between individual's carbon footprints and today's extreme inequality within countries. Thomas Piketty and Lucas Chancel's report highlights the unequal distribution of carbon footprints across different income groups within countries. One reaction to their finding that the richest 1% in many countries are responsible for a large percentage of consumption based emissions is that this should be more evenly distributed within the population. However, the goal can no longer be just to resolve carbon inequality because governments have recently committed to reducing their total greenhouse gas emissions at the COP21 climate conference in Paris.

The scale of action needed to tackle climate change requires reductions in carbon footprints across society. Piketty and Chancel's data highlights that the immediate priority should be to target the richest 1% because they have the highest greenhouse gas emissions per person in many countries. This will not be straight forward in a context of extreme inequality. For example, while carbon taxes would mean the richest 1% had to pay more to consume fossil fuels, they could use the income generated from their existing (and future) wealth to cover this cost. An honest discussion about what policies will work is urgently needed.

With income and wealth inequality at extreme levels in many countries governments may introduce policies to redistribute wealth from the richest to the rest of the population. However, this could increase the national carbon footprint if those individuals who received additional income used it to purchase carbon intensive goods and services. The challenge is to, as far as possible, factor climate change in to policies that aim to reduce inequality, and vice versa.

Endnotes

1 Although Baer et al,. 2009 refer to the issue of inequality within countries in their work on the Greenhouse Development Rights Framework this issue has not received enough attention.

2 They use data on per capita CO2e emissions, consumption based CO2e emissions, and income inequality. See their methodology (page 25) and download their data set.

3 Total greenhouse gas emissions in the United States fell from 6,993 million metric tonnes in 1998 to 6,673 million tonnes in 2013, they peaked in 2007 at 7,400 million tonnes (EPA, 2014).

4 This argument relates to expenditure which does not factor in the carbon footprint of investments which are mainly held by the richest, see footnote 19. Although it is true they might buy "green" goods and services, see Section 3 of this article.

5 It is important to remember that in some ways the richest outsource their environmental impact in the countries where they live (Laurent, 2014; Brehm and Pellow 2013). For example, in the United States research shows a strong correlation between income inequality and air pollution (Peries, 2014). And in the global north the richest (along with most of the population) outsource their carbon footprint to other countries, mainly in the global south (Goldenberg, 2014; Peters et el,. 2011; Chen et al,. 2010).

6 There are existing debates about how to ensure a fairer distribution of national carbon footprints. One proposal is to set personal carbon allowances (other variations of this proposal include Tradable Emissions Quotas) which advocates say would make consumption more equitable, would not be particularly costly and would be effective in reducing greenhouse gas emissions (Parag and Fawcett, 2014; Lockwood, 2010). The scheme would affect all income groups. If an individual wanted to emit above their set carbon allowance (which would get smaller over time) they could pay to purchase surplus units from those individuals who did not use all of their allowance (Chamberlain et al,. 2015). This has led some critics to claim that this would allow the richest to offset their carbon intensive lifestyles (Neslen, 2012). This proposal has mainly been discussed in context of the United Kingdom (Corner, 2012; Carbon Trust, 2012; DEFRA, 2008; Starkey, 2008).

7 Even if its target should be a lot more ambitious, see Climate Action Tracker, 2015.

8 Oxfam's report Extreme Carbon Inequality, 2015 argues that "While it is absolutely critical to any chance of averting the most dangerous impacts of climate change that all developing countries play their part too" there are still huge differences between developed and developing countries total carbon footprints. For example: "Oxfam's estimates suggest that even the richest 10% of Indian citizens have per capita emissions just one-quarter of the poorest 50% of those from the US".

9 These include: 1) The competition for conspicuous consumption between the richest people; 2) Some of the richest people may be disconnected from the reality of the ecological crisis; 3) The richest are likely to have more resources to adapt to and insulate themselves from the impact of climate change e.g. I discuss the impact of Superstorm Sandy on the richest; 4) Rich people may not respond to sustainable consumption information initiatives; See the working paper for full details.

10 Examples of policies that would affect the richest include personal carbon allowances (see footnote 6) and a frequent flyer levy (research shows that in the United Kingdom 15% of the population took 70% of flights in 2013, see Murray, 2015).

11 See previous work on this by Baer et al,. 2009 on the Greenhouse Development Rights Framework.

12 See footnote 20 on how the richest might adapt by using their savings to fund expenditure.

13 Although with oil prices around $30 a barrel this would currently have less impact on the poorest (Benes et al,. 2016).

14 New research by Oxfam estimates 62 people hold more wealth than half of the world's population and calls for a crackdown on tax havens, an increase in wages and increasing investments in public services including health and education, see Oxfam, 2016

15 Defined by Euromontior as "gross income minus social security contributions and income taxes".

16 Whether the pursuit of economic growth should be the goal of the economy is beyond the scope of this comment piece. For a useful summary of debates on whether rising inequality is good or bad for economic growth see Cingano, 2014. See Jackson and Victor, 2014 who question whether declining economic growth inevitably leads to rising inequality. For a detailed critique of Piketty's emphasis on economic growth see Read, 2015.

17 In the United States the cheapest car costs around $12,000 compared to $23,000 for the cheapest electric car. In future the costs of electric cars are expected to fall and some argue are cheaper over the long-term.

18 This is because while they might now be able to afford green energy efficient products they might buy more of them which could mean their total overall carbon footprint could increase. While there has been relative decoupling of economic growth from material throughput, it is unlikely absolute decoupling is possible, see Victor and Jackson, 2015.

19 Piketty and Chancel refer to the carbon footprint of investments and the difficulty in calculating an individual's footprint (pages 21 and 30). There is not space to fully discuss this under-researched area. In terms of carbon footprint this is more likely to be relevant to the richer sections of the population rather than the poorest and middle class. This is because investments are mostly held by wealthier individuals who derive a significant portion of their wealth from them (see share of wealth held by the top 1% in the OECD Wealth Distribution database in 2010 and 2012).

20 As Alex Cobham notes if there was redistribution this could barely affect the richest individuals "who absorb any changes through saving behaviour". Would this mean that even if the richest were taxed to share their wealth they could shift money from their savings to expenditure (or increase their personal debt) to continue to consume at the same amount or increase their carbon footprint? To get an idea of how the richest (High Net Worth Individuals) currently hold their wealth see the 2015 World Wealth Report.

21 Since the mid-1990s VAT has been 5% in the UK on products such as insulation and domestic energy but this will increase to 20% in August 2016 (most likely to affect solar panels and wind turbines) to comply with EU regulations which state the 5% rate only applies to social housing. One study would appear to show all income quintiles in the UK increased their purchase of loft and cavity insulation between 2002-2011, with the poorest 20% owning more than the richest 20% (Advani et al,. 2013), although there are a range of government measures that could explain this and the 5% VAT rate may not have had an effect.

22 This idea is slightly different from the proposal for a personal carbon allowance which would restrict each individual's carbon footprint, see footnote 6.

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