Transport in the Global Carbon Market

Baseline Challenges With Sectoral No-Lose Targets

Adam Millard-Ball, Stanford University

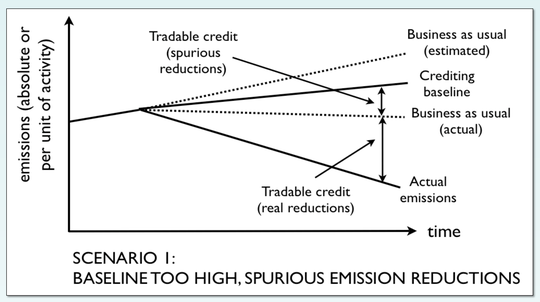
Introduction

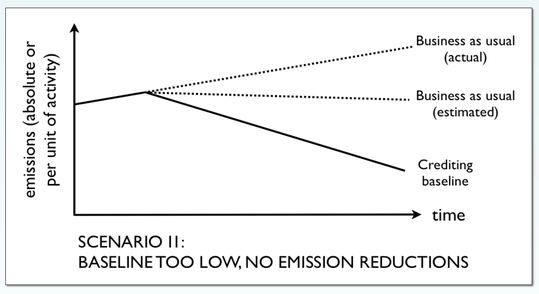
Sectoral no-lose targets (*see box, right*) have been proposed as a way to engage developing countries in a global climate agreement, and overcome the problems of project-level carbon offsets. This paper examines issues with the feasibility of this mechanism for transport.

Setting a Baseline

A crediting baseline for transport would likely be set as a percentage below business-as-usual. In turn, BAU would be projected via a formula including population, GDP, and other exogenous variables such as oil price. The formula cannot include changes in any variable that might be the target of climate policy. If the formula for BAU included local fuel price, for example, a country that eliminated fuel subsidies would find the goalposts moved as the emission savings were incorporated into BAU.

Given uncertainty, the level of the crediting baseline is critical in determining the effectiveness of sectoral no-lose targets. A baseline that is 'too low' would produce non-additional credits *(top)*. One that is 'too high' would render the mechanism moot; the cost for the country to achieve the crediting baseline would be too great *(bottom)*.





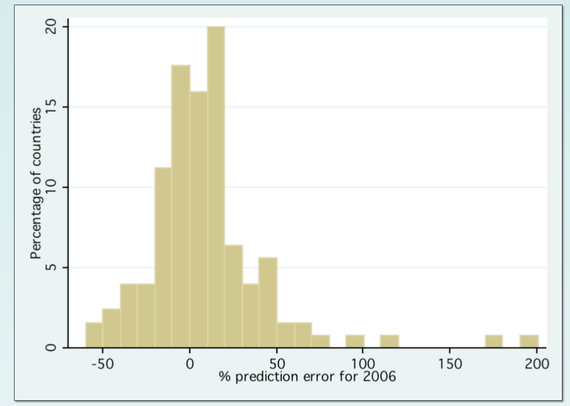
Adam Millard-Ball
Stanford University, Emmett Interdisciplinary Program in Environment & Resources
adammb@stanford.edu
www.stanford.edu/~adammb/

Empirical Results

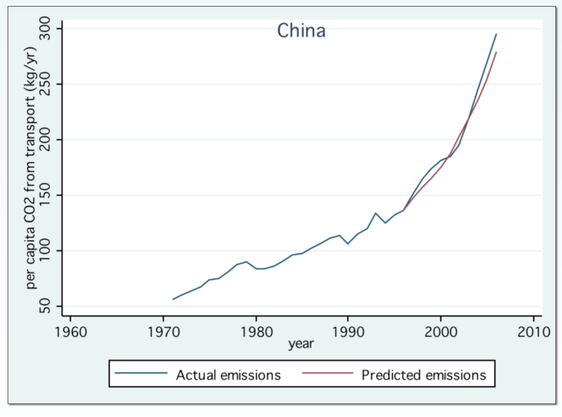
Here, I examine the precision with which business-as-usual emissions can be predicted, using the following variables: GDP per capita and world oil price. The dependent variable is transport CO_2 emissions per capita. I include a country "fixed effect", which accounts for initial levels of (but not changes in) policy variables such as fuel subsidies. I take a hypothetical case in which the baseline formula was set in the 1997 Kyoto Protocol, and assume that past emissions have represented BAU. I then use the model to predict 2006 transport CO_2 emissions.

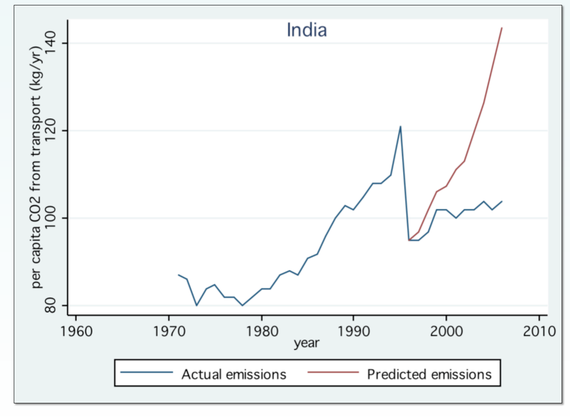
GDP has a large positive effect. Oil price is not significant at conventional levels, but excluding it from the model does not significantly alter the results.

Variable	Beta	(robust s.e.)
Log GDP per capita	0.908	(0.0724)
Log oil price	-0.0228	(0.192)
Constant	-1.59	(0.604)
Country fixed effects?		Yes
R^2 within		0.40
R^2 overall		0.87



The distribution of prediction errors *(above)* shows that only ~1/3 of countries have a prediction within 10% of the actual value for 2006. Looking at the two largest developing country emitters, the prediction error for China is 6% – large in relation to the cuts (say, 15%) that might be expected from developing countries. For India, predicted emissions are nearly 150% of actual, suggesting that it would have generated numerous spurious credits had sectoral no-lose targets been agreed in 1997.

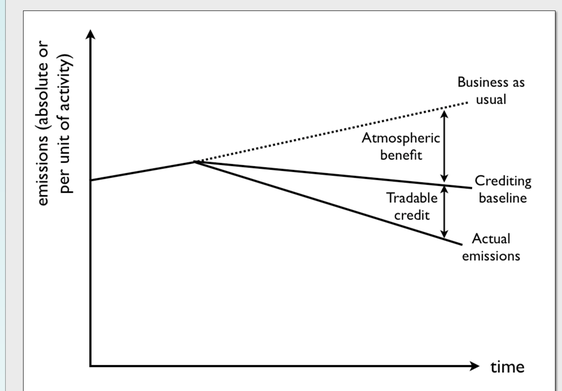




What Are Sectoral No-Lose Targets?

Sectoral no-lose targets would be agreed to voluntarily by developing countries, which could earn tradable credits by reducing emissions to below the sectoral crediting baseline, which in turn would be set below business-as-usual. The difference between BAU and the sectoral crediting baseline represents a reduction in aggregate global emissions. Any further emission reductions would offset emissions in developed countries subject to caps.

Sectoral no-lose targets have several attractions, including the potential to scale up emission reductions beyond those possible with project-level carbon offsets (i.e., the Clean Development Mechanism). Moreover, additionality is no longer an issue. The performance of the sector as a whole is the concern, rather than whether specific projects would have been implemented anyway.



Conclusions

Sectoral no-lose targets have attracted considerable attention in the policy literature. The preliminary analysis here suggests that they will be difficult to implement in practice, due to the fundamental problem with predicting transport baselines with precision. In some countries, sectoral no-lose targets risk being moot as the crediting baseline would be too stringent. In others, they risk generating large volumes of spurious credits as the crediting baseline ends up far above the (unobserved) level of BAU. The implications of the ensuing adverse selection are that high-income countries may transfer large amounts of money to the developing world, while global emissions increase as spurious credits substitute for emission reductions in developed countries.

Acknowledgements. Adam Millard-Ball is supported by a David & Lucille Packard Foundation Stanford Graduate Fellowship and a William C. & Jeanne M. Landreth Fellowship.