Anatomy of China's carbon dioxide emission: the role of induced and autonomous consumptions

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Anthropogenic greenhouse gas (GHG) emissions have been increasing globally since the pre-industrial era, driven largely by economic growth (IPCC, 2014a). Modeling consumption change under the background of economic growth is central to GHG projection models (Lenzen, 1998; Peters and Hertwich, 2008; Hertwich and Peters, 2009; Davis and Caldeira, 2010). With respect to income, consumption is either induced or autonomous. The former is influenced by income level, while the latter is independent of disposable income (Keynes, 1936). Because the induced consumption is more elastic on income and more sensitive on policies, it is important to differentiate these two types of consumption in analytical and projection models for CO2 mitigation. However, few studies make this distinction. Here, we decompose the driving factors of China's CO2 emission by considering the two consumptions in a comprehensive multi-sectoral model. Our projection model based on the decomposition analysis shows that (1) Baseline scenario that estimated induced consumption conservatively will over-estimate Chinaâ€™s CO2 emission; (2) Policy arrangement focusing on induced consumption can mitigate GHG emission efficiently.