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How much did China's WTO accession increase economic growth in resource-rich countries?☆

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ABSTRACT

We provide an estimate of China's impact on the growth rate of resource-rich countries after its WTO accession on 11 December 2001. Our empirical approach follows the logic of the differences-in-differences estimator. In addition to temporal variation arising from the WTO accession, which we argue was exogenous to other countries' growth trajectories, we exploit spatial variation arising from differences in natural resource wealth. This allows us to compare changes in economic growth in the post-accession period relative to the pre-accession period between countries that were able to benefit from the surge in demand for industrial commodities brought about by China's WTO accession and countries that were less able to do so. We find that roughly one tenth of average annual post-accession growth in resource-rich countries was due to China's increased appetite for commodities. We use this finding to inform the debate about what will happen to economic growth in resource-rich countries as China rebalances and its demand for commodities weakens.

1. Introduction

Many countries, and in particular emerging markets, have experienced extraordinarily rapid economic growth during the past decade or so.[2] This paper quantifies the extent to which natural resources have contributed to this growth. We focus on the period 2002–08, i.e. the period which began immediately after China entered the WTO and which ended just as the global financial crisis started to discharge its depressive force in earnest. We focus on this particular period not only because commodity price inflation accelerated around 2002 and then turned negative in 2008, but also because this period allows us to combine plausibly exogenous *temporal* variation in commodity demand with plausibly exogenous *spatial* variation in the supply of natural resources for purposes of identification.[3]

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[1] Disclaimer: Thomas Harr is an employee of Standard Chartered Bank, Singapore (the Bank). Contents in this article are the authors' personal views and do not represent the views of the Bank.
[2] Even Africa has joined the club of fast-growing regions. The IMF's *World Economic Outlook* (October 2012) projects Africa's real GDP growth for 2013 to be 5.7%.
[3] Earlier papers investigating the impact of China's WTO accession include Shafaeddin (2004), Wang (2003), and Wong (2003).

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More specifically, our empirical approach follows the logic of the differences-in-differences estimator. We exploit temporal variation arising from China's WTO accession on 11 December 2001 and spatial variation arising from differences in the availability of natural resources such as coal, oil and minerals. This allows us to compare changes in economic growth in the post-accession period (2002-08) relative to the pre-accession period (1992–2001) between countries that stood to benefit from the increase in demand for industrial commodities brought about by China's WTO accession and countries that did not.[4]

For our full sample of 173 countries, we find that the increased demand for various raw materials induced by China's WTO accession increased average annual real economic growth by about 0.28 percentage points. In relative terms – i.e. as a share of total (actual) growth – this translates into 10.4%. Put differently, one tenth of actual average annual growth between 2002 and 2008 was, according to our calculations, due to China's increased demand for raw materials. We perform similar calculations for all major regions of the world. For the sub-Saharan African sample, for instance, we find that China's WTO accession increased average annual real economic growth by 0.35 percentage points in absolute terms and 14.6% in relative terms.

The credibility of our empirical strategy, and consequently of our results, centers on the assumption that there were no other changes that (i) occurred around the time of China's WTO accession, and that at the same time (ii) correlate with natural resource availability and (iii) affect economic growth. In other words, if a potential change is thought to threaten our identification strategy, it must be the case that this change simultaneously fulfills (i)–(iii); if it fails to do so, it cannot, as a matter of logic, constitute a threat to the validity of our approach.

Investigating the extent to which natural resources have contributed to economic growth is interesting for at least two reasons. First, it speaks to the "metals or management" debate, which revolves around the relative importance of improved economic management versus the surge in international commodity prices as the key driver of growth in resource-rich emerging markets (Andersen & Jensen, 2014; Beny & Cook, 2009).[5] Finding, as we do, a modest impact from natural resource availability is evidence against the view that strong economic growth in emerging markets over the last decade has been driven primarily by the boom in commodities.[6] Second, it speaks to the ongoing debate about how commodity exporters will be impacted as the Chinese economy rebalances. China has begun the process of shifting its developmental model from one driven by exports and debt-fueled investment to a more sustainable model driven to a larger extent by domestic consumption (Pettis, 2013). There is no doubt that we will see significantly slower Chinese growth as a consequence.[7] This will affect economies around the world; it will in particular hurt exporters of raw materials such as Africa, Australia, and Latin America.[8] Pessimists, such as Ocampo and Erten (2013), even argue that it will mean the end of "income convergence worldwide." We use our empirical model to inform this debate. Indeed, our results suggest that commodity producers should be able to withstand slower Chinese growth in coming decades.

The paper is structured as follows. Section 2 discusses China's WTO accession, with the aim of establishing (i) that it caused a commodity boom and (ii) that it was exogenous to other countries' growth trajectories. Section 3 discusses the empirical strategy in detail, while data are discussed in Section 4. Section 5 presents our results. Section 6 addresses economic significance using different counterfactual scenarios, and this section also discusses what happens when China slows. Concluding remarks are offered in Section 7.

2. China's WTO accession as the cause of the recent commodity boom

A commodity price boom that was unprecedented in magnitude and duration preceded the recent global economic crisis (Erten & Ocampo, 2012). Most commodity analysts agree that a critical factor behind the rise in commodity prices was the strength of Chinese demand for industrial commodities (Ocampo & Erten, 2013; Yu, 2011). According to the IMF's *World Economic Outlook* (2006, Chapter 6), China contributed almost all of the increase in world consumption of nickel and tin during 2002–05. In the cases of lead and zinc, China's contribution even exceeded net world consumption growth. For the two most widely traded base metals, aluminum and copper, as well as for steel, the contribution of China to world consumption growth was about 50%. According to the same IMF report, China's contribution to world consumption growth of aluminum increased by 10 percentage points, copper by 8, lead by 68, nickel by 75, steel by 16, tin by 52, and zinc by 71 percentage points, compared to the period 1993–

[4] To minimize measurement error in economic growth rates, we follow the lead of Henderson et al. (2012) and construct adjusted growth rates using earthlights observable from outer space. This adjustment is only possible for the period 1992–2008, which explains the length of our sample window. We do, however, also report results from unadjusted (PPP) growth rates.

[5] Conventional wisdom in the financial press appears to be that resource-rich countries have enjoyed a long boom thanks to China's hunger for commodities; see e.g. *Financial Times*, 1 July 2013, "China's long march."

[6] This squares well with Andersen and Jensen (2014), who find that "economic management" explains a large part of Africa's recent growth spurt.

[7] The World Bank estimates that Chinese growth will slow to between 6% and 7% by the end of the decade; see *Financial Times*, 15 April 2011, "China enters era of slower growth." This compares with an average of 10.2% over the last decade.

[8] The IMF has attributed much of this growth to China's increasing appetite for natural resources, especially energy and metals. Fund researchers find that when demand in China falls, so do commodity exports from commodity-exporting countries. On average, 1 percentage point decline in Chinese demand translates into a fall in commodity exports of about 0.4%. Financial markets clearly see eye-to-eye with the IMF on the prominence of Chinese demand for commodity exporting countries. For instance, in a week when the leaders of Australia and New Zealand happened to be in China to sign trade deals, the former two countries' currencies rose by 2% and 3%, respectively. The following week, both currencies plummeted in accord as China released figures showing that the economy had grown at a much slower pace than expected; see *Financial Times*, 24 April 2013, "Hidden benefits of China's slower growth."