Scarcity and Resource Costs: Tracking Payment Flows in the Global Economy

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Abstract. Due to a surge in supply from new sources, the world price of a barrel of oil has fallen substantially. As a consequence, governments relying on export of the highest-cost oil experience budget shortfalls as wealth is redistributed to consumers, especially those in industrialized countries. So long as the world price remains low, oil from shale deposits and tar sands, as well as many conventional deposits, will become unprofitable, and renewables will have a higher hurdle to become competitive. Other vital resources besides oil whose distribution is spatially concentrated, especially if the lowest-cost endowments are also the most extensive, are subject to the same dynamic.

This paper complements Duchin and Levine (2013) that tracks resources in global supply chains. We construct the framework for developing the corresponding payment networks and then calculate them under scenarios making alternative assumptions about future material requirements and substitutions, technologies for resource extraction, processing, and fabrication, and material recovery for reuse. Each network charts the pathway from consumer outlays for goods to the ultimate payments to the owners of embodied resources and other factors of production.

The paper provides an illustrative numerical example for scenarios specifying progressively greater increases in consumer demand. These scenarios require higher-cost producers of oil to begin production, raising the scarcity rents received by owners of the lower-cost endowments. The example illustrates the critical importance of how much more costly the new deposits are to exploit, relative to those deposits that previously had been the highest-cost and thus the setters of the world price. In cases where the decrease in resource quality or access is large, the transfer of income and wealth can be enormous.