

## **Abstract for “Productivity Measurement with Natural Capital”**

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Traditional measures of multi-factor productivity (MFP) growth generally do not recognise natural capital as inputs into the production process. Since productivity growth is measured as the residual between output and input growth, it will pick up the growth in unmeasured inputs, which can lead to a bias. The purpose of this paper is to gain a better understanding of the role of natural capital for productivity measurement and as a source of economic growth. To this aim, the production function is extended to incorporate the use of natural capital as an input factor in addition to labour and produced capital, such as machines, infrastructure and buildings. More specifically, this paper considers oil and gas, various minerals and roundwood as natural capital inputs, drawing on data from the World Bank. Results suggest that failing to account for natural capital tends to lead to an underestimation of productivity growth in countries where the use of natural capital in production is declining because of a dwindling natural capital stock. In return, productivity growth is sometimes overestimated in times of natural resource booms, if natural capital is not taken into account as an input factor. The direction of the adjustment to productivity growth depends on the rate of change of natural capital extraction *relative* to the rate of change of other inputs. The extended framework also makes the contribution of natural capital to economic growth explicit, and provides useful information regarding needs to tap into other sources of growth, once natural capital endowments start to decline.