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How Does Education Contribute to Productivity? A Social Infrastructure Approach Applied to the US and UK

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This paper develops a novel approach to estimating the impact of education on productivity by treating schooling produced knowledge as intangible assets. This draws on a paper by the authors "Measuring education services using lifetime incomes" that estimates the nominal value of education investment using a framework that is consistent on the expenditure, output and income sides of the national accounts while ensuring consistency with existing national accounts boundaries. The approach adapts the Jorgenson-Fraumeni lifetime income approach, such that enrolments by education type are multiplied by the amount by which lifetime earnings change with additional qualifications, taking account of the impact of experience on earnings. The education of foreign students is treated as export services.

The framework in the earlier paper is then extended to draw out the implications for productivity within a standard growth accounting framework. The aggregate economy production function is extended to include the additional output produced by this intangible asset and inputs are extended to include the stock of students enrolled in education. Conventional measures of labour and capital services are unchanged. Knowledge produced in schools adds to both outputs and inputs, so the net impact on total factor productivity is an empirical matter. Implementing this approach requires replacing current national accounts nominal and real outputs and expenditures by our new measures. The paper examines both the impact on productivity in the education producing sector itself and the aggregate economy.

The model is estimated using data for the US and the UK covering the time period 1993 to 2018. We use a Mincer regression approach to back out the portion of lifetime earnings that can be attributed to formal education. In both countries we combine data from labour force surveys (CPS and UK LFS) with enrolment statistics and data on numbers of international students. Preliminary estimates for the UK show significantly improved TFP growth in the education sector when its output is measured using the increments to lifetime income rather than the current cost weighted enrolment based measures. However, average TFP growth throughout the

period remains lower in the education sector than in other sectors of the economy, so the impact on aggregate economy TFP growth is negative.

The analysis will allow comparisons between these two major economies. The model allows us to trace the impact of differences in underlying demographics and relative earnings on outputs and investments in education and how they have changed over time.