EXECUTIVE SUMMARY

CROSS-COUNTRY ANALYSIS OF PRODUCTIVITY AND SKILLS AT SECTOR LEVEL

RESEARCH REPORT 23
MAY 2007

skills FOR BUSINESS

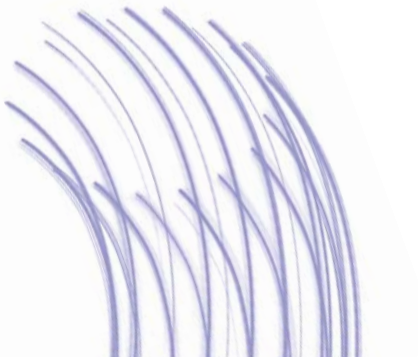
The SSDA commissions research to develop understanding of key areas around its strategic goals, one of which is to work with partners to deliver improvements in productivity and business performance through skills development. This research project, undertaken for the SSDA by NIESR, seeks to explore the contribution of skills to productivity and in particular to understand sectoral differences in international productivity variations and the impact of skills.

Background

In the light of research evidence that workforce skills and training are positively related to productivity performance at sector and firm level, it is perhaps surprising that some international comparisons of relative productivity performance at sector and national level only attribute relatively small proportions of the identified productivity gaps to cross-country differences in workforce skill levels.

In this study we identify a number of reasons why the impact of skills on relative performance at sector and national level may not be captured through standard growth accounting and regression techniques used in earlier international comparisons, for example:

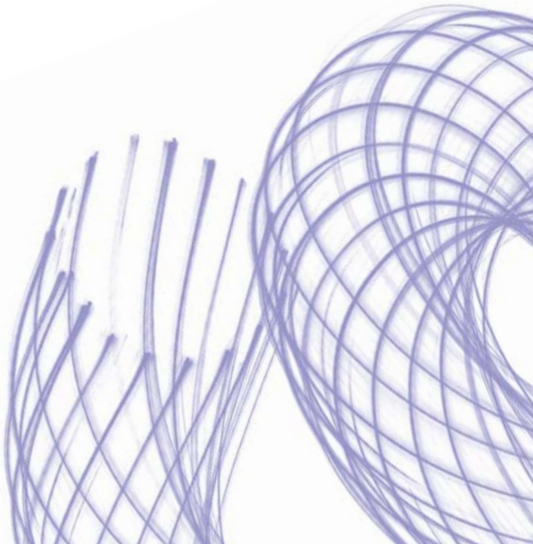
- Difficulties in measuring skills
- Misspecification of production functions in econometric analysis
- Failure to take account of potential complementarities between skills and other production inputs
- Failure to take account of mechanisms by which skills may have an indirect impact on productivity at sector and national level, for example, by contributing positively to the generation and distribution of economically valuable knowledge.



Our approach

Using new measures of skills derived from data on educational attainments and average hourly wages by qualification groups, we present a number of new analyses on sector-level datasets for the UK, US, France, Germany and the Netherlands in order to explore the links between workforce skills and productivity.

We begin by estimating a production function with and without human capital as an independent variable in order to observe the effects of skills on average labour productivity (i.e. on output controlling for labour inputs). The model is then gradually developed to allow for differences in the effects of human capital across countries and industries. We use panel estimation methods to exploit the combined time series and cross-sectional dimensions of our data, which enables us to control for industry-specific factors that might otherwise go undetected, and thus enhance understanding of international productivity differences of industry. We estimate 'catch-up' models of productivity growth which emphasise the scope for sectors in different countries with lower initial levels of productivity to grow faster than productivity leaders by using skilled labour to adopt and make use of technologies and work practices developed elsewhere. We also investigate the complementarity between different types of physical capital and skills and the role of skill-related externalities, or spillover effects, in which skilled labour may facilitate the identification and implementation of new knowledge and ideas and thus contribute to innovation and productivity. Thus, this study seeks to address many of the reasons why skills may not be captured through standard growth accounting and regression techniques.

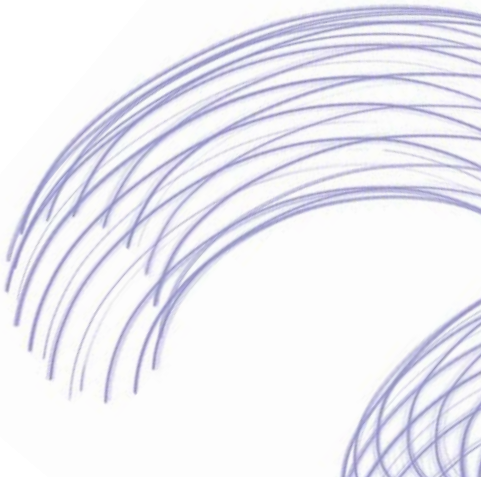


Results

Our main findings are as follows:

1. Human capital levels are strongly related to average labour productivity levels across a wide range of sectors. Growth in human capital also contributes positively to productivity growth rates over fairly long periods of time in 'follower countries' which are seeking to bridge gaps in productivity between themselves and the 'leader country' at sector level. However, this catching-up effect tends to unfold over a relatively long timeframe. There is little evidence of growth in human capital having a short-term impact on productivity growth.

2. When we relax assumptions of full use of resources and allow for varying degrees of inefficiency in the use of production inputs, we find evidence that inefficiency is negatively related to human capital. Thus skills contribute indirectly as well as directly to labour productivity performance by helping to improve the way that all resources are utilised. The UK performs well on technical efficiency in many sectors where it compares less favourably on average labour productivity. This suggests that the UK productivity disadvantage in those sectors is more due to shortcomings in terms of resource levels (for example, relatively low physical capital per hour worked) than to inefficiency in the use of resources.



3. At different times in different sectors and countries, workforce skills have contributed positively to productivity performance by facilitating the adoption and efficient use of new technologies such as Information and Communication Technologies (ICTs). However, the extent and nature of such complementarities appears to vary strongly between countries. As new technologies become established, the skill requirements associated with them may decline.

4. Human capital also contributes to productivity performance through positive contributions to Research and Development (R&D) and innovation. A key mechanism by which it may do so is through the development of 'absorptive capacity' at sector level, i.e. the capacity to make effective use of knowledge, ideas and technologies that become available through spillovers between firms, sectors and countries.

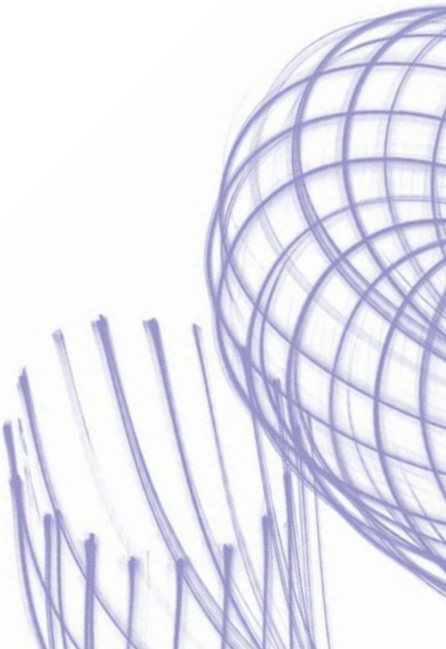
In the specific case of the UK it is notable in international comparisons that relative skill levels and relative productivity levels are frequently correlated at sector level. The evidence in this report suggests that many UK sectors which compare badly on workforce skill measures stand little chance of catching up with productivity leaders unless efforts are made to identify and fill key gaps in skills. Some of the sectors with the largest gaps in skills compared to other countries employ large numbers of people, for example, inland transport, retail and branches of engineering and vehicles.

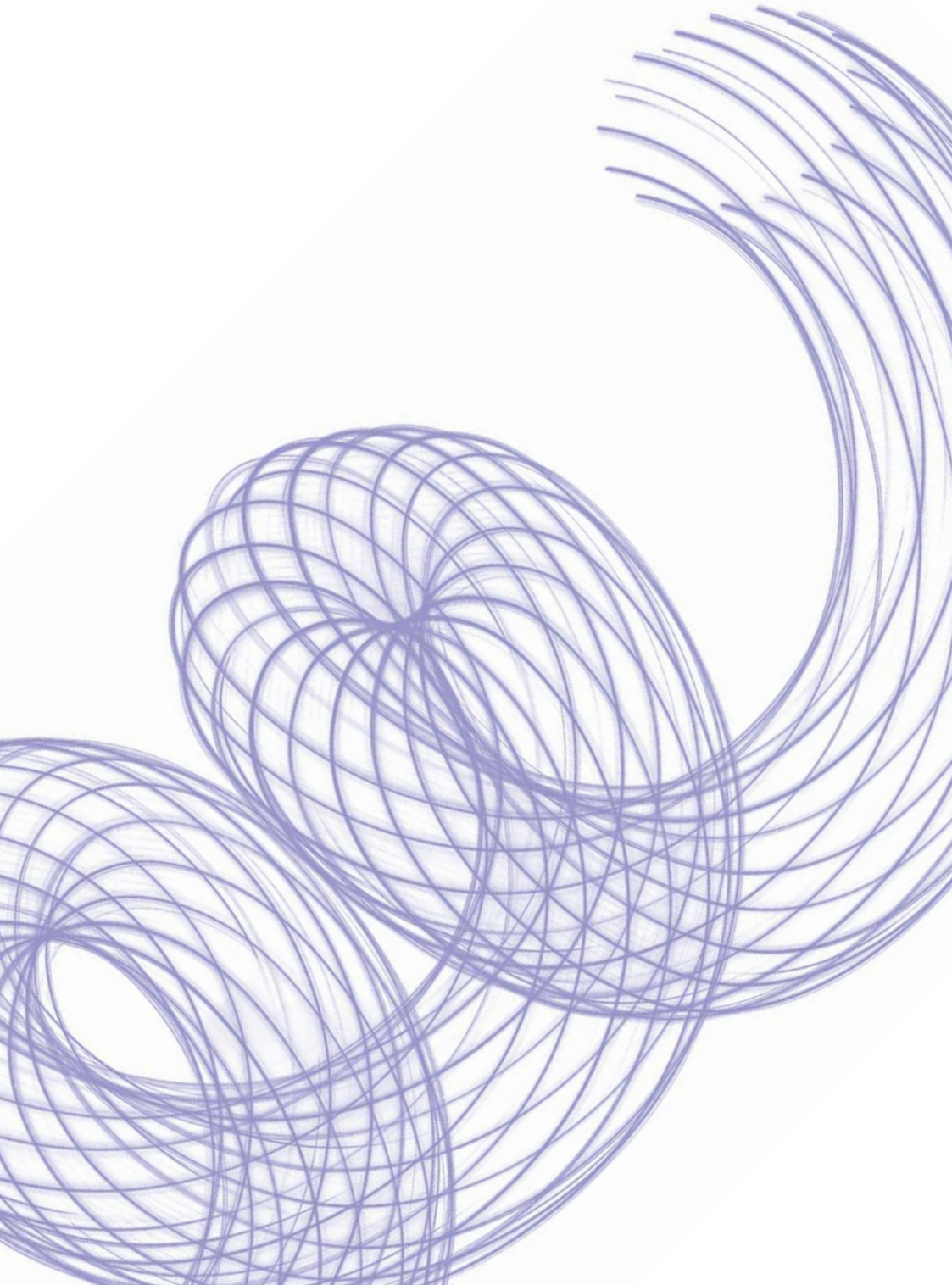
Implications

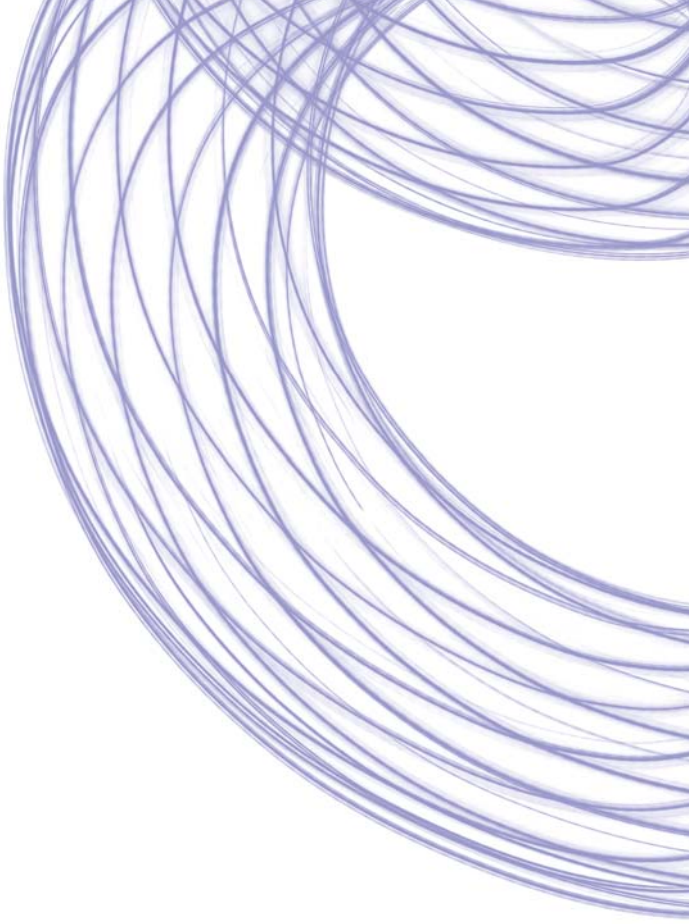
The main findings of this report add to the urgency surrounding key recommendations made by the Leitch Review of Skills, for example:

- A stronger employer voice in vocational education and training provision to help meet skills needs and bridge the productivity gap
- Vocational qualifications to be made more relevant to the skills development needs of both employers and individuals to ensure that the skills acquired are those which will contribute most to improved productivity performance
- Improved incentives for individual workers to invest in their own skills development
- Greater data availability at sector level to help persuade employers of the benefits of increased investment in skills and training.

The pay-off to such improvements is unlikely to become evident in the short-term. However, our evidence suggests that skill improvements will contribute positively to productivity performance over the long term if they are combined with new investments in other production inputs with which skills are complementary, for example, new technologies and research and innovation.







This report is a summary of a research report carried out by NIESR and on behalf of the Sector Skills Development Agency.

Full copies of the report can be downloaded from the Research section at www.ssda.org.uk