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An analysis of the relevance of off-balance sheet items in explaining productivity change in European banking

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Notes

¹Important developments in this field have been introduced, among others, by the work of Diewert ([1976](#), [1978](#), [1981](#)), Caves et al. ([1982a](#) and [1982b](#)) and Färe et al. ([1985](#), [1994](#)).

²Shephard's ([1970](#)) distance functions have guided much of the development in efficiency and productivity analysis. In a multi-input multi-output framework, an output distance function is defined as the reciprocal of the maximum proportional expansion of the output vector, given inputs. An input distance function is defined as the reciprocal of the maximum proportional contraction of the input vector, given outputs.

³In his empirical work, Farrell ([1957](#)) defines technical efficiency as the maximum proportional contraction of inputs. He also indicated that, under constant returns to scale, this may be interpreted as the percentage by which output could be increased using the same inputs. The interpretation of Farrell's measures of technical efficiency as reciprocals of distance functions can be found in Färe et al. ([1985](#), [1994](#)).

⁴For a literature survey on the subject, see Grosskopf ([1993](#)) and Färe et al. ([1997](#)). Also, Ray and Desli ([1997](#)) discuss the conceptual framework and Mukherjee et al. ([2001](#)) discuss the empirical aspects.

⁵The input

⁶It is to be noted that the institutions, namely the World Bank and the Royal Bank of Canada, are the main sponsors of the project.

⁷Specifically, the project was initiated for the whole bank in 1994 (13.46) in Germany and the UK.

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