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## Prologue: ‘Not even wrong’

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The physicist Wolfgang Pauli was, with Heisenberg, Schrödinger and Dirac, one of the early leaders in the development of quantum mechanics. He was renowned for being a tough audience, exclaiming ‘wrong’ (*falsch*), or ‘completely wrong’ (*ganz falsch*) when he disagreed with a speaker. Near the end of his life, when asked his opinion of a recent article by a younger physicist, he sadly said ‘it is not even wrong’ (*Das ist nicht einmal falsch*) . . . *A scientific idea is ‘not even wrong’ if it is so incomplete that it cannot be used to make predictions that could be compared to observations to see if the idea is wrong.*

(Peter Woit, 2006, p. 6, emphasis added; for a biography of Wolfgang Pauli, see Peierls, 1960)

This book shows that the aggregate production function suffers from this same problem, namely it is ‘not even wrong’. Aggregate production functions are estimated using constant-price value (or monetary) data. This, together with an underlying accounting identity that by definition relates value added, or gross output, to the value of the total payments to the inputs, means that a near perfect statistical fit can always be obtained by estimating an aggregate production function. This is even though aggregation and other problems suggest that the aggregate production function does not exist. Furthermore, the estimated parameters, such as the ‘output elasticities’ and the aggregate ‘elasticity of substitution’ cannot be taken as being determined by the underlying technology. All that can be said with certainty is that the estimates reflect the mathematical transformation of the linear accounting identity.

Herbert Simon (1979a, p. 497) put it succinctly as follows in his Nobel Prize speech:

Fitted Cobb–Douglas functions are homogeneous, generally of degree close to unity and with a labor exponent of about the right magnitude. These findings, however, cannot be taken as strong evidence for the [neo]classical theory, for the identical results can readily be produced by mistakenly fitting a Cobb–Douglas function to data that were in fact generated by a linear accounting identity (value of goods equals labor cost plus capital cost), (see E.H. Phelps-Brown [1957]). The same comment applies to the SMAC production function (see Richard Cyert and Simon [1971]).

This book elaborates and extends the argument why the aggregate production function is ‘not even wrong’ in that, in Woit’s words, predictions from it cannot be ‘compared to observations to see if the idea is wrong’.