Twists, Euler products and a converse theorem
for *L*-functions of degree 2

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Abstract. We prove a general result relating the shape of the Euler product of an *L*-function to the analytic properties of the linear twists of the *L*-function itself. Then, by a sharp form of the transformation formula for linear twists, we check the required analytic properties in the case of *L*-functions of degree 2 and conductor 1 in the Selberg class. Finally we prove a converse theorem, showing that $\zeta(s)^2$ is the only member of the Selberg class with degree 2, conductor 1 and a pole at $s = 1$.