

Does final energy demand in Portugal exhibit long memory? A fractional integration analysis

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Abstract In this paper, we measure the degree of fractional integration in final energy demand in Portugal using an ARFIMA model with and without adjustments for seasonality. We consider aggregate energy demand as well as final demand for petroleum, electricity, coal, and natural gas. Our findings suggest the presence of long memory in all of the components of energy demand. All fractional-difference parameters are positive and lower than 0.5 indicating that the series are stationary, although with mean reversion patterns slower than in the typical short-run processes. These results have important implications for the design of energy policies. As a result of the long-memory in final energy demand, the effects of temporary policy shocks will tend to disappear slowly. This means that even transitory shocks have long lasting effects. Given the temporary nature of these effects, however, permanent effects on final energy demand require permanent policies. This is unlike what would be suggested by the more standard, but much more limited, unit root approach, which would incorrectly indicate that even transitory policies would have permanent effects.

Keywords Long memory · Final energy demand · ARFIMA model · Portugal

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