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# On Biomass Energy Consumption and Real Output in the US

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## Abstract

This empirical note utilizes US annual data from 1949 to 2007 to examine the causal relationship between biomass energy consumption and real gross domestic product (GDP) within a multivariate framework. Toda-Yamamoto causality tests reveal unidirectional causality from biomass energy consumption to real GDP supportive of the growth hypothesis.

Keywords:

biomass energy consumption

Granger-causality

real GDP

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# Notes

<sup>1</sup>Energy Information Administration, Monthly Energy Review, July 2008.

<sup>2</sup>National Renewable Energy Laboratory, [www.nrel.gov](http://www.nrel.gov). [Balat and Ayar \(2005\)](#) survey world trends toward biomass energy use while [Kaygusuz \(2009\)](#) provides a review of the production, consumption, and technologies for biofuels in developed and developing countries.

<sup>3</sup>The US Department of Energy (DOE) undertakes a number of programs to facilitate the development of biomass as an energy source: The DOE Biofuels Program develops new technologies to utilize low-cost cellulosic biomass into ethanol; the DOE Biopower Program addresses biomass-based electricity generation systems and the development of sustainable energy crops; and the DOE Regional Biomass Energy Program provides cost-sharing and other support to state and local governments in the production and use of biomass energy.

<sup>4</sup>Much of the discussion of the hypotheses and related literature is drawn from the survey article on the causal relationship between energy consumption and economic growth by [Payne \(2010\)](#).

<sup>5</sup>The following are the dates in which data is reported by the Energy Information Administration ([www.eia.doe.gov](http://www.eia.doe.gov)) for the various subcategories of biomass energy consumption: wood (1949–2007), waste (1970–2007), and biofuels (1981–2007).

<sup>6</sup>The use of real gross fixed capital formation as a proxy for capital follows the work of Soytaş and Sari (2008) and citations therein.

<sup>7</sup>Test statistics for Granger-causality have the standard asymptotic distribution to draw valid inferences.

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