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The Chinese chaos game

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Abstract

The yuan-dollar returns prior to the 2005 revaluation show a Sierpinski triangle in an iterated function system clumpiness test. Yet the fractal vanishes after the revaluation. The Sierpinski commonly emerges in the chaos game, where randomness coexists with deterministic rules (M.F. Barnsley, Fractals Everywhere, Academic Press, San Diego, 1988; H.O. Peitgen, H. Jurgens, D. Saupe, Chaos and Fractals: New Frontiers of Science, Springer, New York, 1992). Here, it is explained by the yuan's pegs to the US dollar, which made more than half of the data points close to zero. Extra data from the Brazilian and Argentine experiences do confirm that the fractal emerges whenever exchange rate pegs are kept for too long.

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1. Introduction

China introduced market reforms in the early 1980s. Only a third of the economy is now directly statecontrolled. The country has become a global economic force and joined the World Trade Organization in 2001. It currently exports more information technology goods than the United States. It also created a commodity-market boom, and turned into the world's third largest car market. Over a dozen Chinese companies are on the *Fortune* 500 list.

From 16 June 1994 to 21 July 2005 China pegged its currency, the yuan, at 8.28 to the dollar. Following the 2005 revaluation the yuan's central rate against the dollar was shifted by 2.1% to 8.11%. From then on, the yuan is said to be linked to a basket of currencies, the central parities of which are set at the end of each day. The Chinese central bank called it a "managed floating exchange-rate regime". Yet as of 30 March 2006, the yuan has risen by a mere 1% against the dollar (left-hand chart in Fig. 1). Zhou Xiaochuan, the central bank's governor, said that he understood it was in China's interest to make the yuan more flexible over time, but that this needed to be gradual.

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Fig. 1. The yuan. Source: Thomson Datastream, J. P. Morgan Chase, The Economist.



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