

A MATHEMATICAL MODEL OF THE BUSINESS CYCLE

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In this thesis we concentrate on the trade cycle in the nineteenth century developed nations especially Great Britain. We first discuss the evidence for and observations on the trade cycle, together with the major theories and opinions of economists. We conclude that no existing trade cycle model explains fully the qualitative features of the trade cycle. This failure particularly applies to the phenomenon of the "crash".

We construct a model which places its emphasis on business confidence. In doing this we introduce a new quantitative concept of business confidence. Our model reproduces the qualitative details of the nineteenth century cycles. In so doing we provide an explanation not only for the rhythm of the cycles, but also for the manias, panics and crashes which were their most noticeable characteristic. The model we construct is mathematically highly nonlinear and difficult to study analytically.

We also show mathematically that, for fundamental reasons, this model does not vary about some equilibrium point or growth path.

We are then lead to conclude that the trade cycle is the normal mode of functioning of a competitive economic system, not a deviation from a

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"normal" state of equilibrium. As a consequence for economic theory in general, the study of equilibria or of exponential growth, while interesting theoretical exercises, are of no relevance to predicting the course of the economy or the effect of economic policy.

We affirm the importance of changes to the money supply. These changes affect markedly both the amplitude of the cycle and the general trend, without greatly affecting the existence or nor shape of the cycle. Manipulating the money supply is of little use in preventing a crash, and too low a rate of growth of the money supply results (in our model) in lower prosperity.

We suggest an important and in the long run beneficial economic function for the nineteenth century trade cycle.

We discuss the importance and type of random shocks to an economy, and introduce a new way of introducing them into a model. We study the effect of shocks on the trade cycle and demonstrate that random shocks are not the major factor.

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