Modelling the Roman economy: lessons learned from applying computational modelling techniques to the study of Roman tableware distributions

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Ceramic tableware is arguably one of the most common finds on sites in the Roman East and lends itself particularly well to quantification. There is no lack of descriptive models explaining tableware distributions in the Roman East, many of which concern the functioning of the Roman trade system, and most scholars agree that the Roman trade system was a complex affair involving multiple factors. However, we see at least four issues with the practice of debating complex descriptive models that prevent breakthroughs in the study of the Roman economy at large:

1. Many models use different concepts to describe the complex past phenomenon that is the Roman economy, making them difficult to compare.
2. The concepts used are not often accompanied by specifications of how they can be represented as data (of whatever nature), and the data patterns one would expect to see as the outcome of the processes described by the model are rarely made explicit.
3. The development of these interesting descriptive models did not go hand in hand with the development of approaches to formally represent, compare, and (where possible) validate them.
4. The role of archaeological data in the study of the Roman economy, although increasingly recognised, deserves more attention since it is the only source of information on the functioning and performance of the Roman economy that allows for quantitative validation in computational modelling approaches thanks to its abundance.

What is needed to start challenging these issues is an approach that (1) requires scholars to formulate models as comparable conceptualisations accompanied by data specifications and expectations, (2) allows for comparing multiple hypothetical scenarios and the data patterns they produce, and (3) shows promise for quantitative comparison with large archaeological datasets. This study has argued and illustrated that computational modelling is such an approach. This approach does not aim at being ‘right’, or at capturing the full complexity of past phenomena. Instead, it tries to map the grey-zone between different factors. It also does not aim to restrict the study of the Roman economy to one way of conceptualising past phenomena, but forces scholars to reflect on the need to make descriptive models comparable.

To explore these issues and methodological suggestions, I will share my experiences of trying to apply computational modelling to understand the distribution of tableware in the Roman East. Together with Jeroen Poblome I created MERCURY (Market Economy and Roman Ceramics Redistribution, after the Roman patron god of commerce), an agent-based model that simulates the distribution of tablewares and compares the simulated output of different experiments with the observed tableware distribution. In particular, it aimed to represent key aspects of Bang’s Roman Bazaar and Temin’s Roman Market Economy using comparable concepts from economics, to simulate the processes driving the distribution of goods as suggested by these scholars, and to compare the results with the archaeologically observed distributions. The Roman economy might well have been very complex, but we conclude that the best way to tackle this complexity is to simplify our treatment of it: define concepts, allow for comparability, and specify expected data patterns.