The Quantitative Evaluation of the Economic Impact of E-Government: a structural Modelling Approach. Information Economics & Policy, 2006

(available at: http://www.spbo.unibo.it/picci/egoveval.pdf)

Methodological Appendix

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The analytical method proposed in the paper hinges on themes that date back to the early history of econometric modeling. Ever since their first appearance in the 1930's, econometric models have described complex dynamic economic systems by means of sets of mathematical equations, whose parameters in part are derived from accounting or other known relationships, and in part are estimated using statistical techniques – most frequently, regression analysis (Morgan, 1990). A given model, after being specified and estimated, can be solved to obtain forecasts for the variables of interest in order to assess the implications of different hypotheses on a set of control variables (Fair, 1984).

The method here proposed represents an unusual application of such an econometric tradition. On the one hand, the parameters of the model have not been estimated. The model itself is simpler than in most econometric applications, its simplicity reflecting both the need for tractability, and a choice favoring gradualism given the novelty of the context. The model describes policies affecting public administrations, before than the economy. In this respect, it is a quantitative model of organizational change, and the innovative aspect of the exercise goes beyond its present

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application, because the same method of analysis could be used to study public policies other than e-government.

An interesting issue regards the presence of alternative model's representations. The paper presents a narrative description, a mathematical one, and also a graphical description (see Figure 1). The model could also be represented through a hypertext (available in digital form from the author), where to each causal link there corresponds a "knot" of the hypertext network.

The presence of alternative representations of the same model should not come as a surprise. At the beginning of the 1950's, William H. Phillips, an engineer turned economist, was building hydraulic machines that, thanks to a set of pumps, pipes and tanks, showed the functioning of an economic system according to the then prevailing interpretation of Keynes' theories. Those ingenious "Phillips machines", as they were to be called, contributed in elucidating some important aspects of the theory to a generation of economists who, principally at the University of Cambridge (UK), had a chance to see them at work (Morgan e Boumans, 2004). Alternative representations of complex economic and social systems not only allow for a better quantification of the relevant variables, but may also be helpful in helping understand the underlying theory.

A last consideration regards the nature of the space where the model is represented. In our case it is adequately describable by a two-dimensional figure (Figure 1 in the paper). In general, however, more complex models are intrinsically three-dimensional, in the sense that it is not possible to order their parts so that their mutual relationships never cross. A hypertext allows for a description of three-dimensional relationships between its knots. A hypertext is three-dimensional. Morgan and Boumans (2004) note that Phillips machines were three-dimensional. As such, they also could be represented as hypertext.

References:

Fair, Ray, 1984, Specification, Estimation, and Analysis of Macroeconomic Models, Harvard University Press, Harvard, MA

Morgan, Mary S., and Marcel Boumans, 2004, "The secrets hidden by two dimensionality: modelling the economy as an idraulic system", in Models: The Third Dimension of Science, Soraya de Chadarevian and Nick Hopwood (eds), Stanford University Press.

Morgan, Mary S., 1990, The History of econometric ideas, Cambridge University Press, Cambridge.