

# How to Classify a Government

## Can a perceptron do it?

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**Abstract** – The electoral cycle literature has developed in two clearly distinct phases. The first one considered the existence of non-rational (naive) voters whereas the second one considered fully rational voters. It is our view that an intermediate approach is more appropriate, i.e. one that considers learning voters, which are boundedly rational. In this sense, one may consider perceptrons as learning mechanisms used by voters to perform a classification of the incumbent in order to distinguish opportunistic (electorally motivated) from benevolent (non-electorally motivated) behaviour of the government. The paper explores precisely the problem of how to classify a government showing in which, if so, circumstances a perceptron can resolve that problem. This is done by considering a model recently considered in the literature, i.e. one allowing for output persistence, which is a feature of aggregate supply that, indeed, may turn impossible to correctly classify the government.

**Keywords** - Classification, Elections, Government, Output Persistence, Perceptrons.

### 1. Introduction

An electoral cycle created by governments is a phenomenon that seems to characterise, at least in some particular occasions and/or circumstances, the democratic economies. As it is generally accepted, the short-run electorally-induced fluctuations prejudice the long-run welfare. Since the very first studies on the matter, some authors offered suggestions as to what should be done against this electorally-induced instability. For some authors, ever since the seminal paper of Nordhaus (1975), a good alternative to the obvious proposal to increase the electoral period length is to consider that voters abandon a passive and naive behaviour and, instead, are willing to learn about government's intentions.

The electoral cycle literature has developed in two clearly distinct phases. The first one, which took place in the mid-1970s, considered the existence of non-rational (naive) voters. In accordance with the

rational expectations revolution, in the late 1980s the second phase of models considered fully rational voters. It is our view that an intermediate approach is more appropriate, i.e. one that considers learning voters, which are boundedly rational. In this sense, one may consider perceptrons as learning mechanisms used by voters to perform a classification of the incumbent in order to distinguish opportunistic (electorally motivated) from benevolent (non-electorally motivated) behaviour of the government. The main objective of this paper consists precisely on studying the problem of how to classify a government showing in which, if so, circumstances a perceptron, can resolve that problem. To achieve this objective we will consider a recent version of a stylised model of economic policy, i.e. a version based on an aggregate supply curve embodying output persistence. See Gärtner (1996,1997,1999,2000) and/or Caleiro (2009,2012).

The rest of the paper is structured as follows. Section 2 offers the analysis of the bounded rationality approach as a motivation for the use of perceptrons as learning devices. Section 3 then presents the characteristics of the perceptron, which will be used to perform the classification of the government task. Section 4 explores the problem of how to classify a government showing in which, if so, circumstances the perceptron can resolve that problem. Section 5 concludes.

### 2. The Bounded Rationality Approach

Generally speaking, learning models have been developed as a reasonable alternative to the unrealistic informational assumption of rational expectations models. Moreover, through learning models it is possible to study the dynamics of adjustment between equilibria which, in most