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Are environmental concerns drivers of innovation? Interpreting Portuguese innovation data to foster environmental foresight

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Abstract

The relationship between environmental concerns and innovation is analyzed in the context of Portuguese manufacturing firms, with the ultimate goal to foster measures of environmental foresight.

Based on data from the Community Innovation Survey in Portugal, simple statistical tests, including χ^2 , t , and Levene's tests and contingency tables (adjusted standardized residuals), were used to study the relationship between firms' characteristics and the introduction of innovation aiming to reduce environmental damage. Environmental foresight is discussed based on three groups of variables that allow considering the industrial context that frames firm's actions, the economic performance of the firm and its innovation patterns.

Results show that the development of innovation due to environmental concerns is positively associated with the firm's size and exports share, and negatively associated with its technological content. Moreover, it is shown that the firms that introduced innovations due to environmental concerns are likely to belong to an economic group, to have performed continuous R&D, or received public support. It is also shown that "lack of organizational flexibility" and "lack of receptivity by customers" are the two most relevant innovation barriers for these firms.

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1. Introduction

Environmental planning and foresight have been established in recent years in terms of emerging policy issues associated with the pursuit of sustainability [1,2]. Central to challenges of achieving sustainable development is the debate over the role of market mechanisms versus state regulations and enforced standards as mechanisms for environmental policies [3]. Regulation is evolving and sustainability policies try to express that there might be an opportunity for a symbiotic relation between environmental objectives and economic efficiency. At the private level, some firms are coming to consider the need to take into account environmental concerns not just as an exogenously imposed cost or constraint, but as a strategic opportunity. As Faucheux et al. [4] wrote, “necessity is thus converted into virtue”.

In a similar way, several authors have consistently argued that the growth of economic controls (laws, policies and standards) is not incompatible with continued economic competitiveness. For example, Porter and van der Linde [5,6] argue that the relationship between environment and competitiveness has been framed incorrectly due to a static view of environmental regulation. The question is that firms have numerous opportunities for technological improvement, but are still inexperienced in dealing creatively with environmental issues. According to these authors, environmental regulation can have an important influence on the direction of technological innovation. In their words, “properly designed environmental standards can trigger innovation that may partially or more than fully offset the costs of complying with them”.

In addition, Hart [7,8] has also written about the required important contribution of firms to achieve sustainable growth, in a way that has raised the need for environmental planning and foresight in terms of sustainability. Despite asserting that the roots of the problem—explosive population growth and rapid economic development of the emerging economies—are political and social issues that exceed the mandate and the capabilities of any corporation, Hart also claims that corporations are the only organizations with the resources, the technology, the global reach, and, ultimately, the motivation to achieve sustainability.

Most of the arguments above were derived from analysis at the firm level and have been continuously criticized in the macro-economic literature, in that Porter and van der Linde’s hypothesis has been shown to be a defence of stringent environmental regulation that makes essentially no reference to the social benefits of such regulation [9]. In fact, discussion persists on the positive or negative relation between the environment and the economy, through the introduction of innovative processes and activities [10]. Improved understanding of this relation is key for the design of adequate environmental foresight and requires the identification of firms’ characteristics fostering innovation due to environmental concerns.

This paper addresses this issue making use of a large database on Portuguese innovative firms, which have been identified through the European Community Innovation Survey, CIS. Next section describes the methodology used, while the third section presents sample results. The results are discussed in the final section, which also includes the main conclusions of the paper.

2. Methodology

The paper uses data about Portuguese manufacturing firms, collected under the framework of the second Community Innovation Survey (CIS II), referring to the period 1995–1997 [10,11]. The sample was selected by the National Institute of Statistics and included 1429 manufacturing firms extracted from a

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