Available online at www.sciencedirect.com
ScienceDirect
European Journal of Operational Research 181 (2007) 1554–1573
EUROPEAN JOURNAL OF OPERATIONAL RESEARCH
www.elsevier.com/locate/ejor

Rough Sets and the role of the monetary policy in financial stability (macroeconomic problem) and the prediction of insolvency in insurance sector (microeconomic problem)

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Received 1 December 2004; accepted 1 January 2006
Available online 5 June 2006

Abstract

This paper faces two questions related with financial stability. The first one is a macroeconomic problem in which we try to further investigate the role of monetary policy in explaining banking sector fragility and, ultimately, systemic banking crisis. It analyses a large sample of countries in the period 1981–1999. We find that the degree of central bank independence is one of the key variables to explain financial crisis. However, the effects of the degree of independence are not linear. Surprisingly, either a high degree of independence or a high degree of dependence are compatible with a situation of financial stability, while intermediate levels of independence are more likely associated with financial crisis. It seems that it is the uncertainty related with a non-clear allocation of monetary policy responsibilities that contributes to financial crisis episodes.

The second one is a microeconomic problem: the prediction of insolvency in insurance companies. This question has been a concern of several parties stemmed from the perceived need to protect general public and to minimize the costs associated such as the effects on state insurance guaranty funds or the responsibilities for management and auditors. We have developed a bankruptcy prediction model for Spanish non-life insurance companies and the results obtained are very encouraging in comparison with previous analysis. This model could be used as an early warning system for supervisors in charge of the soundness of these entities and/or in charge of the financial system stability.

Most methods applied in the past to tackle these two problems are techniques of statistical nature and, variables employed in these models do not usually satisfy statistical assumptions what complicates the analysis. We propose an approach to undertake these questions based on Rough Set Theory.

Keywords: Rough Sets; Financial stability; Central bank independence; Insolvency; Insurance companies

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doi:10.1016/j.ejor.2006.01.045

1. Introduction

The financial system plays a crucial role in economic development as responsible for the allocation of resources over time and among different alternatives of investment by pricing the postposition of consumption (free risk rate) and pricing the risk (risk premium). A correct functioning of the financial system allows economies to reach higher levels of real growth as well as more stable macroeconomic conditions. In the last 20 years at least 10 countries have experienced the simultaneous onset of banking and currency crisis, with contractions in Gross Domestic Product of between 5% and 12% in the first year of the crisis, and negative or only slightly positive growth for several years thereafter (Stiglitz and Furman, 1998). Therefore, preserving financial stability is one of the main goals for policy makers since the beginning of the monetary systems.

The especial role that banks play in the financial system and their specificities as money issuers explain why a great number of financial crisis had got the banking sector as protagonist. In the 1980s and 1990s several countries, including developed economies, developing countries, and economies in transition have experienced severe banking crises. Such proliferation of large scale banking sector problems has raised widespread concern, as banking crises disrupt the flow of credit to households and enterprises, reducing investment and consumption and possibly forcing viable firms into bankruptcy. Banking crises may also jeopardize the functioning of the payments system and, by undermining confidence in domestic financial institutions; they may cause a decline in domestic savings and/or a large scale capital outflow. Finally, a systemic crisis may force sound banks to go to bankrupt.

Preventing the occurrence of systemic banking problems is undoubtedly a chief objective for policy-makers, and understanding the mechanisms that are behind the surge in banking crises in the last decades is a first step in this direction. A number of studies have analyzed various episodes of banking sector distress in an effort to draw useful policy lessons (González-Hermosillo, 1996; Kaminsky and Reinhart, 1999).

The goal of the first study we present in this paper is to identify the factors behind banking sector fragility focusing on the role of monetary policy. Our panel includes all market economies for which data were available in the period 1981–1999. The explanatory variables capture many of the factors suggested by the theory and highlighted by empirical studies.

There is no clear consensus on how monetary policy and financial stability are related. In particular, it is not clear whether there are any trade-offs or synergies between them. This issue is very important, since it could help to devise arrangements and policy responses to promote both monetary and financial stability. The design of monetary policy should be particularly important since the central bank has a natural role in ensuring financial stability, as argued by Padoa-Schioppa (2002)[1] and Schinasi (2003), and has virtually always been involved in financial stability, directly or indirectly.[2]

As important as to gain some insight on the macro factors which contribute to financial stability is to know fragilities that arise at the micro level. Although a sound macro economic and institutional environment is crucial to promote financial stability, supervisors have to perform a continuous basis oversigh on the individual elements that constitute the financial system: financial companies, markets, clearing and settlements institutions, etc. in order to guarantee an appropriate level of financial stability.

Although, as it is said above, many financial crisis are associated with the banking sector, globalization, the emergence of conglomerates, financial innovation, and system integration makes more and more difficult to isolate one part of the financial system from another. The nature of potential instability may have already taken new forms as a consequence of the ongoing transformation of the financial system. Such recent changes in the financial system might be summarized by the breakdown in the separations between financial institutions and financial markets, between the three main categories of financial institutions (banks, insurance companies, and on-bank financial institutions), and between national financial systems. These separations have been replaced by an increasing integration of markets with banks, and of banks with other financial institutions, and by an increasing internationalization of the financial system. Therefore, new potential sources of disturbances can be identified that are closely related to this changed

[1] In his words, "the issue of financial stability was part of the central banks' genetic code".

[2] For a description of the role of central banks in financial stability across regimes see Borio and Lowe (2002).