

DIRECTED RISK RESEARCH PROBLEM STATEMENT

Risk Theme	Systemic risk	Problem Nr.	PS16004
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PROJECT TITLE: Systemic Banking Crisis Early Warning Systems Using Dynamic Bayesian Networks

PROJECT GOAL:

The development and application of dynamic Bayesian networks as early warning systems for systemic banking crises.

HIGH LEVEL DESCRIPTION OF PROBLEM:

It is proposed that the development and application of dynamic Bayesian networks for the problem of systemic banking crises could yield useful insights, with the aim to identify a crisis before it occurs. i.e. identifying a pre-crisis period. There is some work that has been done on this topic involving developed countries in the European Union [1], which can be used as a basis. .

[1] P Laina, J Nyholm and P Sarlin, 2015. Leading indicators of systemic banking crises: Finland in a panel of EU countries. Review of Financial Economics 24, 18 – 35.

PROJECT OBJECTIVES:

For many years systemic banking crisis early warning systems have been dominated by the signal extraction and logit model methods [2]. These methods do not consider the dynamics of the variables of interest (indicator variables) in the banking system. It is proposed that dynamic Bayesian networks [3] be developed and applied to model the dynamics of indicator variables.

[2] Demirgüç-Kunt, A., Detragiache, E., 2005. Cross-country empirical studies of systemic bank distress: A survey. National Institute Economic Review 192 (1), 68–83.

[3] J.J. Dabrowski, J.P. de Villiers and C. Beyers, 2016. Naive Bayes switching linear dynamical system: A model for dynamic system modelling, classification and data fusion. Information Fusion - Under review.

OUTPUTS REQUIRED:

- A paper in the academic financial literature
- Practical Guidance to the industry on local / international best practice

STRATEGIC VALUE TO DIRECTED RISK RESEARCH:

This research project forms part of an overarching systemic risk research initiative to develop macro-economic models (e.g. for South Africa) that can be used to study systemic risk.

This research will add to existing models for banking crisis early warning systems. The results of the model could assist decision makers in regulatory bodies to make decisions on early intervention.