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DEFAULT CLUSTERING IN LARGE PORTFOLIOS: TYPICAL EVENTS

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We develop a dynamic point process model of correlated default timing in a portfolio of firms, and analyze typical default profiles in the limit as the size of the pool grows. In our model, a firm defaults at a stochastic intensity that is influenced by an idiosyncratic risk process, a systematic risk process common to all firms, and past defaults. We prove a law of large numbers for the default rate in the pool, which describes the "typical" behavior of defaults.

1. Introduction. The financial crisis of 2007–09 has made clear the need to better understand the diversification of risk in financial systems with interacting entities. Prior to the crisis, the common belief was that risk had been diversified away by using the tools of structured finance. As it turned out, the correlation between assets was much larger than supposed. The collapse fed on itself and created a spiral.

We study the behavior of defaults in a large portfolio of interacting firms. We develop a dynamic point process model of correlated default timing, and then analyze typical default profiles in the limit as the number of constituent firms grows. Our empirically motivated model incorporates two distinct sources of default clustering. Firstly, the firms are exposed to a risk factor process that is common to all entities in the pool. Variations in this systematic risk factor generate correlated movements in firms' conditional default probabilities. Das, Duffie, Kapadia and Saita (2007) [DDKS07] show that this mechanism is responsible for a large amount of corporate default clustering in the U.S. Secondly, a default has a contagious impact on the health of other firms. This impact fades away with time. Azizpour, Giesecke, and Schwenkler (2010) [AGS10] provide statistical evidence for the presence

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