

Empirical Examination of Operational Loss Distributions

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1 Introduction

Until very recently, it has been believed that banks are exposed to two main types of risks: credit risk (the counterparty failure risk) and market risk (the risk of loss due to changes in market indicators, such as interest rates and exchange rates), in the order of importance. The remaining financial risks have been put in the category of *other* risks, operational risk being one of them. Recent developments in the financial industry have shown that the importance of operational risk has been largely under-estimated. Newly defined capital requirements set by the Basel Committee for Banking Supervision in 2004, require financial institutions to estimate the capital charge to cover their operational losses [6].

This paper is organized as follows. In Section 2 we give the definition of operational risk and describe the effect of the recent developments in the global financial industry on banks' exposures to operational risk. The following section, Section 3, will briefly outline the recent requirements set by the Basel Committee regarding the capital charge for operational

risk. After that we proceed to Section 4 that presents several alternative models that can be used for operational risk modeling. In Section 5 the class of heavy-tailed α Stable distributions and their extensions are defined and reviewed. Section 6 consists of the empirical analysis with real operational risk data. Finally, Section 7 summarizes the findings and discusses directions for future work.

2 Definition of Operational Risk in Finance

Operational risk has been recently defined as ‘the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events’ [4]. Examples include losses resulting from deliberate or accidental accounting errors, equipment failures, credit card fraud, tax non-compliance, unauthorized trading activities, business disruptions due to natural disasters and vandalism. Operational risk affects the soundness and efficiency of all banking activities.

Until recently, the importance of operational risk has been highly underestimated by the banking industry. The losses due to operational risk has been largely viewed as unsubstantial in magnitude, with a minor impact on the banking decision-making and capital allocation. However, increased investors’ appetites have led to significant changes in the global financial industry during the last couple of decades - globalization and deregulation, accelerated technological innovation and revolutionary advances in the information network, and increase in the scope of financial services and products. These have caused significant changes in banks’ risk profiles, making banks more vulnerable to various sources of risk. These changes have also brought the operational risk to the center of attention of financial regulators and practitioners.

A number of large-scale (exceeding \$1 billion in value) operational losses, involving high-profile financial institutions, have shaken the global financial industry in the past two decades: BCCI (1991), Orange Country (1994), Barings Bank (1995), Daiwa Bank (1995), NatWest (1997), Allied Irish Banks (2002), the Enron scandal (2004), among others.

3 Capital Requirements for Operational Risk

The Basel Committee for Banking Supervision (BCBS) has brought into focus the importance of operational risk in 1998 [2], and since 2001 bank regulators have been working on developing capital-based counter-measures to protect the global banking industry against the risk of operational losses