Data Security in the Digital Age: Reputation and Strategic Interactions in Security Investment

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Abstract

The recent string of massive data breaches suggests that firms may be underinvesting in data security. This has led to discussions on regulatory interventions. This paper develops a model of data security investment that could provide a framework for these discussions. In the baseline model, a website and a unit mass of consumers interact across two periods. Underinvestment in data security arises as the website does not fully internalise consumers' losses from data breaches. The website's incentive to invest stems from the customer turnover that may result from a breach; imperfect breach detection by the consumers, however, weakens this reputation effect. The model is then extended to include a third player - the consumers' bank. Under this setup, the overall level of security depends on both the website's and the bank's investment levels. I examine the implications of regulatory policies - specifically, mandatory breach notification and minimum security standards - that may be introduced to increase the level of security in both the baseline and the extended settings. I show that these policies may not always result in higher overall level of security, demonstrating the importance of accounting for strategic behaviours in regulatory interventions.

1 Introduction

Rapid advancements in technology have enabled firms, particularly those on the Internet, to collect, analyse and store large amounts of consumer information in an

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