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Inconsistencies in Bond Market Quotes: Is it the Wrong Model or the Wrong Data?

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Abstract

We use the linear programming approach to quantify quote inconsistencies in risk-free bond markets. We present an algorithm to identify whether an inconsistency is probably due to the insufficient framework flexibility, the insufficient data quality, or the non-homogeneity of the dataset. In the latter case we study the problem of filtering out some instruments so that the remaining dataset be homogeneous. We show that the traditional filtering approach performs unacceptably poor and propose new algorithms. We find that the bonds, which get mispriced the most by a fitting algorithm, surprisingly are not the bonds, which cause the inconsistencies.

Keywords: quote inconsistency, data filtering, risk-free bonds, linear inequality system, approximate algorithm

2000 MSC: 91G80, 68W25, 90C90, 90-04, 90B99

1. Introduction

The notion of arbitrage plays a key role in the financial theory. Many, if not all asset pricing frameworks include a no-arbitrage supposition. However, when applied to the real data, some frameworks often result in arbitrage opportunities. This does not necessarily imply the existence of real-world arbitrage opportunities. Theoretical arbitrage opportunities (which we call inconsistencies in the paper to avoid the word ‘arbitrage’) may be caused by various factors, real examples of which will follow in the main body of the paper.

1. Insufficient framework flexibility. The framework might lack important

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