

## Summaries

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Sylvia Endres: **Review of stochastic differential equations in statistical arbitrage pairs trading** ■ *Managerial Economics* 2019, vol. 20, No. 2

*JEL classification:* G11, G12, G14

**Keywords:** *statistical arbitrage, pairs trading, stochastic models, mean-reversion, stochastic differential equations*

The use of stochastic differential equations offers great advantages for statistical arbitrage pairs trading. In particular, it allows the selection of pairs with desirable properties, e.g., strong mean-reversion, and it renders traditional rules of thumb for trading unnecessary. This study provides an exhaustive survey dedicated to this field by systematically classifying the large body of literature and revealing potential gaps in research. From a total of more than 80 relevant references, five main strands of stochastic spread models are identified, covering the ‘Ornstein–Uhlenbeck model’, ‘extended Ornstein–Uhlenbeck models’, ‘advanced mean-reverting diffusion models’, ‘diffusion models with a non-stationary component’, and ‘other models’. Along these five main categories of stochastic models, we shed light on the underlying mathematics, hereby revealing advantages and limitations for pairs trading. Based on this, the works of each category are further surveyed along the employed statistical arbitrage frameworks, i.e., analytic and dynamic programming approaches. Finally, the main findings are summarized and promising directions for future research are indicated.

Jessica Hastenteufel, Mareike Staub: **Current and future challenges of family businesses** ■ *Managerial Economics* 2019, vol. 20, No. 2

*JEL classification:* L21, L26, M12, M14

**Keywords:** *family business, family business governance, business succession*

Family businesses are an important part of every economy. They are characterized by long traditions that combine aspects such as trust and reliability, as well as by features such as innovativeness, foresight, long-term focus and flexibility. Both family businesses and the entrepreneurial families themselves do have some weaknesses and face current challenges like digitization, internationalization and demographic change. These issues must be kept in mind in order to constantly develop appropriate solutions that will help them survive and thrive in the market. Moreover, the high relevance of the family in a family business is associated with opportunities – for example, when a family strategy with clear values, roles and goals is defined, and a so-called family business governance is developed.

**Katarzyna Kowalska-Jarnot: Selected methods of studying a college's image** ■  
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*JEL classification:* D20, M31

Positive image and reputation building are important strategies in developing the permanent recognition of a college in the education market. Although it seems challenging to measure image and reputation, they are an important opportunity to gain a competitive advantage due to the fact that they are unique, hard to imitate and increase a college's chances of attracting more students. Image management requires systematic marketing research. This article is the author's proposition for a set of image research methods that can be used by colleges.

**Keywords:** *organization identity, image research, reputation*

**Jonas Rende: Pairs trading with the persistence-based decomposition model** ■  
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*JEL classification:* G11, G12, G14

**Keywords:** *persistence, high-frequency, pairs trading, permanent components, transient components, noise*

Recently, the persistence-based decomposition (PBD) model has been introduced to the scientific community by Rende et al. (2019). It decomposes a spread time series between two securities into three components capturing infinite, finite, and no shock persistence. The authors provide empirical evidence that the model adapts well to noisy high-frequency data in terms of model fitting and prediction. We put the PBD model to test on a large-scale high-frequency pairs trading application, using S&P 500 minute-by-minute data from 1998 to 2016. After accounting for execution limitations (waiting rule, volume constraints, and short-selling fees) the PBD model yields statistically significant and economically meaningful annual returns after transaction costs of 9.16 percent. These returns can only partially be explained by the exposure to common risk. In addition, the model is superior in terms of risk-return metrics. The model performs very well in bear markets. We quantify the impact of execution limitations on risk and return measures by relaxing backtesting restrictions step-by-step. If no restrictions are imposed, we find annual returns after costs of 138.6 percent.