

**ALGORITHM EXAMPLES IN FINANCIAL MARKETS: ASSETS INCOME ANALYZING, BENCHMARK AND BACKTESTING WITH PYTHON PROGRAMMING**

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**ABSTRACT**

**Purpose-** The need for fast and reliable trading has increased to reduce human and non-human risks in financial markets and to change the pricing in the markets. Algorithms are prepared and used as a result of technological opportunities to manage these risks and to facilitate the management of revenue policies. Strategies can be created based on historical information on asset prices and these strategies can be implemented through algorithms. This study aims to analyze the performance of the applications of the created strategies with algorithms.

**Methodology-** Based on the prices that occurred in the market within a certain period, instead of "keep in portfolio", the results of the buy-sell transactions made in accordance with the condition-condition principle such as golden cross of algorithmic trade transactions were compared. The program, in which 50-day and 200-day moving averages are used in algorithmic transactions, was written in Python (vs. 2.7).

**Findings-** By using the same, similar or different algorithms for different asset types, different rates of positive and negative returns can be obtained.The results obtained provide evidence that algorithmic transactions can perform better against the acquisition and retention of the asset in the portfolio.

**Conclusion-** In the study comparing algorithmic transactions with the “keep in portfolio” investment strategy, varying results were obtained for different assets. Although the findings show that the same strategy cannot bring positive returns for every financial instrument, it is recommended to develop strategies specific to different asset groups for future studies.

**Keywords:** Algorithmic trade, benchmark and backtest, assets income analyzing, data science

**JEL Codes:** D53, F47, G11,

**FİNANSAL PİYASALARDA ALGORİTMA UYGULAMALARI: PYTHON PROGRAMLAMA İLE GETİRİ ANALİZİ, KIYASLAMA VE KARŞILAŞTIRMA**

**ÖZET**

**Amaç-** Finansal piyasalarda beşeri ve beşeri olmayan risklerin azaltılması ve piyasalardaki fiyatlamaların değişimlerine yönelik hızlı ve güvenilir bir şekilde alım-satım yapma ihtiyacı artmıştır. Söz konusu risklerin yönetilmesi ve getiri politikalarının yönetiminin kolaylaştırılması için teknolojik imkanlar neticesinde algoritmalar hazırlanmakta ve kullanılmaktadır. Varlık fiyatlarındaki geçmiş bilgiye göre stratejiler oluşturulabilmekte ve bu stratejiler algoritmalar vasıtasıyla uygulanabilmektedir. Bu çalışmanın amacı, oluşturulan stratejilerin algoritmalar vasıtasıyla yapılan uygulamalarının performanslarını analiz etmektir.

**Yöntem-** Belirli bir dönem içerisinde piyasada oluşan fiyatlamalar baz alınarak “portföyde tut” yerine algoritmik trade işlemlerinin golden cross vb. Koşul-şart ilkesi doğrultusunda yapılan al-sat işlemleri sonuçları mukayese edilmiştir. Algoritmik işlemlerde 50 günlük ve 200 günlük hareketli ortalamaların kullanıldığı program, Python dilinde (vs. 2.7) yazılmıştır.

**Bulgular-** Farklı varlık türlerinde aynı, benzer veya farklı algoritmalar kullanılarak farklı oranlarda pozitif veya negative getiriler elde edilebilmektedir. Elde edilen sonuçlar, algoritmik işlemlerin varlığın portföye alınıp tutulmasına karşı daha yüksek performans gösterebileceğine dair kanıtlar sunmaktadır.

**Sonuç-** Algoritmik işlemlerin “portföyde tut” yatırım stratejisi ile karşılaştırıldığı çalışmada, farklı varlıklar için değişen sonuçlar elde edilmiştir. Bulgular, her finansal enstrüman için aynı stratejinin pozitif getiriye ulaştıramaycağını göstermekle beraber bundan sonraki çalışmalar için farklı varlık gruplarına özgü stratejiler geliştirilmesi önerilmektedir.

**Anahtar Kelimeler:** Algoritmik trade, geçmişe dönük testler, getiri analizi, veri bilimi

**JEL Kodları:** D53, F47, G11,

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