

EVOLUTIONARY BEHAVIOURAL FINANCE

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Joint work with [R. Amir](#), [W. Bahsoun](#), [S. Belkov](#), [T. Hens](#), [K.R. Schenk-Hoppé](#), and [L. Xu](#)

Evolutionary Behavioural Finance (EBF) is a novel direction of research at the interface of Mathematical Finance and Financial Economics that combines evolutionary and behavioural approaches to the modelling of financial markets. The ultimate goal is to create a plausible alternative to classical General Equilibrium theory (Arrow, Debreu, Radner and others) currently serving as the basis for mainstream Financial Economics. Conventional GE analysis relies upon the hypothesis of full rationality of market players, who are assumed to maximize their utilities subject to budget constraints, i.e. solve well-defined and precisely stated constrained optimization problems. EBF models relax these restrictive assumptions and permit traders/investors to have a whole variety of patterns of behaviour determined by their individual psychology, not necessarily describable in terms of individual utility maximization. Strategies may involve, for example, mimicking, satisficing, rules of thumb based on experience, etc. Strategies might be interactive – depending on the behaviour of the others. Objectives might be of an evolutionary nature: survival (especially in crisis environments), domination in a market segment, fastest capital growth, etc. They might be relative – taking into account the performance of the others.

The models considered in EBF combine elements of evolutionary game theory (solution concepts) and stochastic dynamic games (strategic frameworks). The main focus is on investment strategies that “survive” in the market selection process, i.e., guarantee with probability one a positive, bounded away from zero share of market wealth over an infinite time horizon. Typical results show that such strategies exist, are asymptotically unique and can be computed by explicit formulas. The computations do not require (in contrast with GE) the knowledge of unobservable individual agents' characteristics, such as individual utilities and beliefs, which makes EBF models amenable for quantitative practical applications.

UK Research Excellence Framework 2014. Impact Case Study

[REF2014 Impact Case Study](#): Mathematical Behavioural Finance, joint research with with [R. Amir](#), [T. Hens](#) and [K.R. Schenk-Hoppé](#).

Working papers

Nash equilibrium strategies and survival portfolio rules in evolutionary models of asset markets, [Swiss Finance Institute Research Paper No. 17-17](#), 2017 (with [S. Belkov](#), [T. Hens](#) and [L. Xu](#)).

Evolutionary finance models with short selling and endogenous asset supply, [Swiss Finance Institute Research Paper No. 17-26](#), 2017 (with [S. Belkov](#) and [T. Hens](#)).

An evolutionary finance model with a risk-free asset, [Swiss Finance Institute Research Paper No. 17-28](#), 2017 (with [S. Belkov](#) and [T. Hens](#)).

Published papers

Evolutionary behavioural finance. Handbook of Post Crisis Financial Modelling (E. Haven et al., eds.), Palgrave MacMillan, 2015, 214-234 (with [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [PDF](#)

Asset market games of survival: A synthesis of evolutionary and dynamic games, 2013, Annals of Finance, v. 9, 121-144 (with [R. Amir](#) and [K.R. Schenk-Hoppé](#)). [DOI](#)

Introduction to the Special Issue on Behavioral and Evolutionary Finance, 2013, Annals of Finance, v. 9, 115–119 (with [K.R. Schenk-Hoppé](#) and [W.T. Ziemba](#)). [DOI](#)

Evolutionary finance and dynamic games, 2011, Mathematics and Financial Economics, v. 5, 161-184 (with [R. Amir](#), [T. Hens](#) and [L. Xu](#)). [DOI](#)

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Almost sure Nash equilibrium strategies in evolutionary models of asset markets, Mathematical Methods of Operations Research, 2011, v. 73, 235-250 (with [W. Bahsoun](#) and [L. Xu](#)). [DOI](#)

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Evolutionary finance, 2009, in: Handbook of Financial Markets: Dynamics and Evolution ([T. Hens](#) and [K.R. Schenk-Hoppé](#), eds.), a volume in the Handbooks in Finance series, [W.T. Ziemba](#), ed., Elsevier, Amsterdam, pp. 507-566 (with [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [PDF](#)

Globally evolutionarily stable portfolio rules, 2008, Journal of Economic Theory, v. 140, 197-228 (with [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [DOI](#)

Evolutionary Stable Stock Markets, 2006, Economic Theory, v. 27, 449-468 (with [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [DOI](#)

Market selection and survival of investment strategies, 2005, Journal of Mathematical Economics, Special Issue on Evolutionary Finance, v.41, 105-122 (with [R. Amir](#), [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [DOI](#)

Market selection of financial trading strategies: Global stability, 2002, Mathematical Finance, v. 12, 329-339 (with [T. Hens](#) and [K.R. Schenk-Hoppé](#)). [DOI](#)