

RESEARCH AND DEVELOPMENT



A Periodical of the University of Thessaly

Research Committee of the University of Thessaly
Office for Technology Transfer and Research Support

Issue 02 / 2015

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Quitting cigarettes and alcohol through exercise

Thales Programme

Environmentally friendly biomass production

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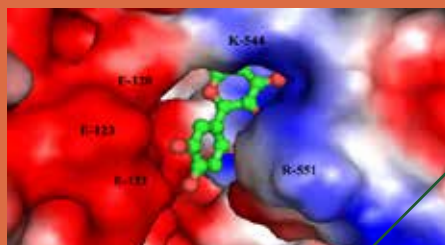
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Research and Development

Knowledge production is inherent in the nature of the university. On the one hand it aims to respond to the need of people to know and understand as much and as accurately as possible the elements and processes of the physical and social space. On the other, it serves the need for the expansion of the cultural, political and economic opportunities that can emerge within local or national communities, and throughout global society.

Despite the crucial nature of the role of research in economic development, knowledge production in the academic space, given the social nature of the university, is required to contribute to the relationship between science and society in a mutually beneficial and reciprocal way. This need has become more urgent in the current historical, economic and political moment of ongoing transformations, whose functions often appear to weaken rather than strengthen the important values of equality and democratic participation.

In this framework, the university's research orientation requires a refocused academic space in order to restore its crucial role as a literal space of knowledge alternatives, and as an exemplary model of knowledge experimentation and processing, one that foregrounds the potential of new knowledge to creatively enrich human life, both locally and on a broader level. A redefining is required, furthermore, in order to ensure that the role of the university is not just limited to the implementation of central strategic objectives and research priorities. Rather, it also needs to respond to local development requirements and to stake out its role in the formulation of proposals that can affect change in the central (national, European) design (bottom-up procedures) and to achieve the best possible results.

The University of Thessaly has developed its own vision for research and innovation based on this concept. It is concerned about the quality of research – basic and applied – and is striving to increase its financing (from national and European resources), to expand its international cooperation and to exploit the results of these efforts at the local and wider level.

Quitting cigarettes and alcohol through exercise

Thales-funded study finds exercise programmes coupled with psychological support can help smokers and alcoholics curb their addictions



Conducted by the Department of Physical Education and Sport Science, the research project on Exercise, Smoking and Alcohol: A Study on Mechanisms and Interventions for Prevention, Giving up and Awareness had four objectives.

First, it sought to develop a theoretical and applied framework of support and self-regulation for smokers and alcoholics in order to help them quit. Second, it investigated the effects of different exercise intensities on the psychological, physiological and biochemical factors that contribute to the prevention of smoking and alcohol consumption. Third, it examined the effects of important psychological, physiological and biochemical mechanisms that are activated during exercise in smokers and alcoholics. Finally, it sought to develop, implement and evaluate fitness programmes based on optimal levels of exercise intensity that have the most beneficial effects on smokers and alcoholics in maintaining abstinence. The exercise programmes were combined with counselling and psychological support techniques in order to encourage exercise engagement and discourage cigarette smoking and alcohol consumption.

In the first experiment, heavy smokers exercised for 30 minutes on a bicycle ergometer. The results showed that while the urge to smoke was significantly lower immediately after exercise, the craving returned to baseline levels 30 minutes later. Smokers also preferred to select the exercise intensity themselves rather than have it determined for them.

The second experiment examined the effects of two different exercise intensities – moderate and vigorous intensity – on smoking behaviour. The results showed significant differences between the controlled situation and the two conditions involving different exercise intensities, but not between the moderate and high intensity conditions themselves. In the controlled condition, participants smoked their first cigarette earlier than in the two other conditions. Furthermore, the analysis showed that participants had a preference for the moderate intensity exercise programme and that exercise can have a positive impact on slowing down the urge to smoke the next cigarette.

The third study involved developing and implementing an exercise intervention programme that was coupled with psychological self-regulation strategies. The exercise sessions were conducted in parks or gyms. Each session lasted for 20–30 minutes and gradually increased to 60–70 minutes. Regarding the self-regulation strategies used during this intervention, participants were instructed in each training session to complete forms specifying their personal exercise goals, targets setting the number of cigarettes they would smoke a day, and to focus on breathing during exercise, on positive self-talk and on specific coping strategies to quit smoking. The results showed that participants significantly increased their participation in total physical activity every week. The majority of them quit smoking and the rest reduced their smoking level.

The fourth experiment examined the acute effect of an exercise programme combined with psychological self-regulation strategies on delaying the next cigarette. A group of



smokers participated in a 30-minute exercise protocol on a bicycle ergometer in two sessions of moderate exercise intensity, one of which included self-regulatory strategies. Here, the results indicated that 30 minutes of moderate exercise intensity combined with self-regulatory strategies (goal setting, breathing and self-talk) reduced the urge to smoke and delayed smokers from lighting the next cigarette by 32 minutes.

In considering the effects of exercise on alcoholics, the research team performed a literature review which found that only eight studies have examined the effect of exercise on alcohol consumption and related issues. Six of these studies concluded that exercise may have a positive impact on abstinence rates or the urge to drink. One of those studies also indicated that one round of exercise affects the endogenous opioids, which might be linked to the urge to drink. Despite the limited research data and often contradictory results, there is some promising early evidence on role of exercise as an adjunctive tool in the treatment of alcoholism. Therefore, the fifth experiment of this project examined the effects of low intensity exercise on beta-endorphin (β -E) levels and craving for alcohol among alcoholic patients. The data analysis revealed that exercise resulted in significant increases in β -E and in a decrease in alcohol cravings in alcoholic patients. These results indicate that one round of low intensity exercise affects the endogenous opioids in alcoholic patients.

Finally, qualitative studies conducted as part of the research revealed the positive effect of participating in an exercise programme on the mood, self-esteem and anxiety control of smokers or alcoholics. Furthermore, health education programmes on prevention and awareness, respectively, were designed. Further analyses of these experiments should examine the effects of psychological, physiological and biochemical factors in contributing to quitting smoking and alcohol. The preliminary results of this project show the importance of exercise programmes coupled with psychological support techniques in discouraging cigarette smoking and alcohol consumption.

Environmentally friendly biomass production

THALES-funded project seeks to identify the biomass crops best suited to Greece's conditions and to meeting its international CO₂ reduction targets

The aim of the project is the production of biomass (dry biomass and vegetable oils for the production of first- and second-generation biofuels) from different annual energy crops using environmentally friendly practices. Supported by the Department of Agriculture Crop Production and Rural Environment, the project tests novel cropping practices (tillage and crop establishment, crop rotation) with the aim of improving energy efficiency and cost effectiveness, thus contributing to the development of more sustainable cropping systems by improving soil organic matter content and reducing soil loss through water and wind erosion.

More specifically, the objectives of the programme are

1. To study crops that can be used as biomass in energy production and to select those best suited to Greek conditions and to cover the country's needs
2. To establish best crop rotation practices in order to reduce production inputs such as energy and chemicals (fertilisers, pesticides)
3. To identify cropping practices that protect the soil from erosion and increase its fertility through improving soil structure, soil organic matter and increasing biodiversity
4. To determine cropping practices leading to the more efficient use of natural resources, thus conserving energy and human labour
5. To disseminate and enhance the adoption of reduced and no-till tillage systems through the introduction of high-quality innovative drilling and planting machines
6. To evaluate the new practices based on the economics of exploitation, crop yield, energy savings, the reduction of CO₂ and greenhouse gas (GHG) emissions, life-cycle assessment and the effects on soil conservation and fertility
7. To disseminate the new ideas of soil conservation, crop rotation and biomass production in Greece
8. To study methods and technologies that would enable Greece to adopt and achieve the requirements of international treaties it has signed in the areas of energy and renewable energy, reducing chemicals in agriculture and protecting soil and soil fertility

As part of the project, two no-till drills – one for drilling winter cereals and one for planting spring sown crops – were introduced. This was the first time





that these innovative machines were tested in Greece.

More specifically the project involves:

1. Testing 13 species of energy crops under different tillage systems (conventional and no till). The quantity and quality of the biomass produced were studied and its suitability for different conversion technologies determined
2. Applying an innovative crop rotation system that combines winter and spring crops as well as legumes and other species in order to achieve continuous soil coverage with vegetation so as to minimise soil erosion, reduce weed infestation and nitrogen fertiliser application, increase water use efficiency and improve the use of human labour and farm machinery
3. Applying conservation tillage systems (minimum tillage and no tillage) in order to control erosion, increase soil fertility (by enhancing soil organic matter and biodiversity), reduce energy consumption and increase carbon sequestration in the soil
4. In pilot plots, studying the three systems of crop establishment, two crop rotation systems and three nitrogen

fertilisation levels. The crop data was collected using precision agriculture technology

5. In the same plots, data will be gathered on energy efficiency and cost effectiveness, greenhouse gas emissions and the life cycle assessment

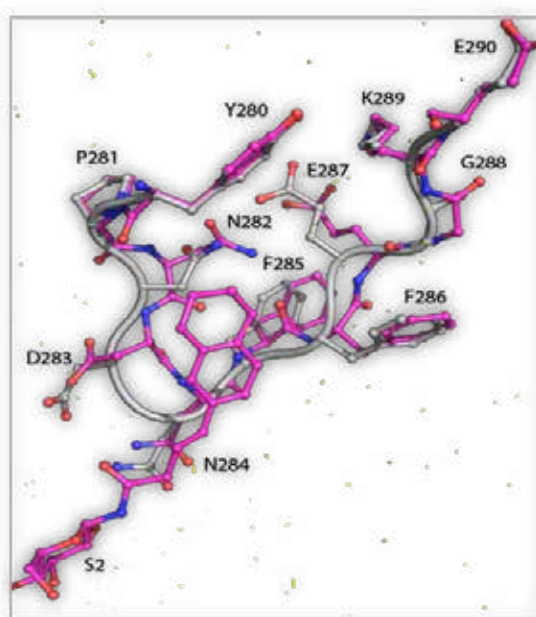
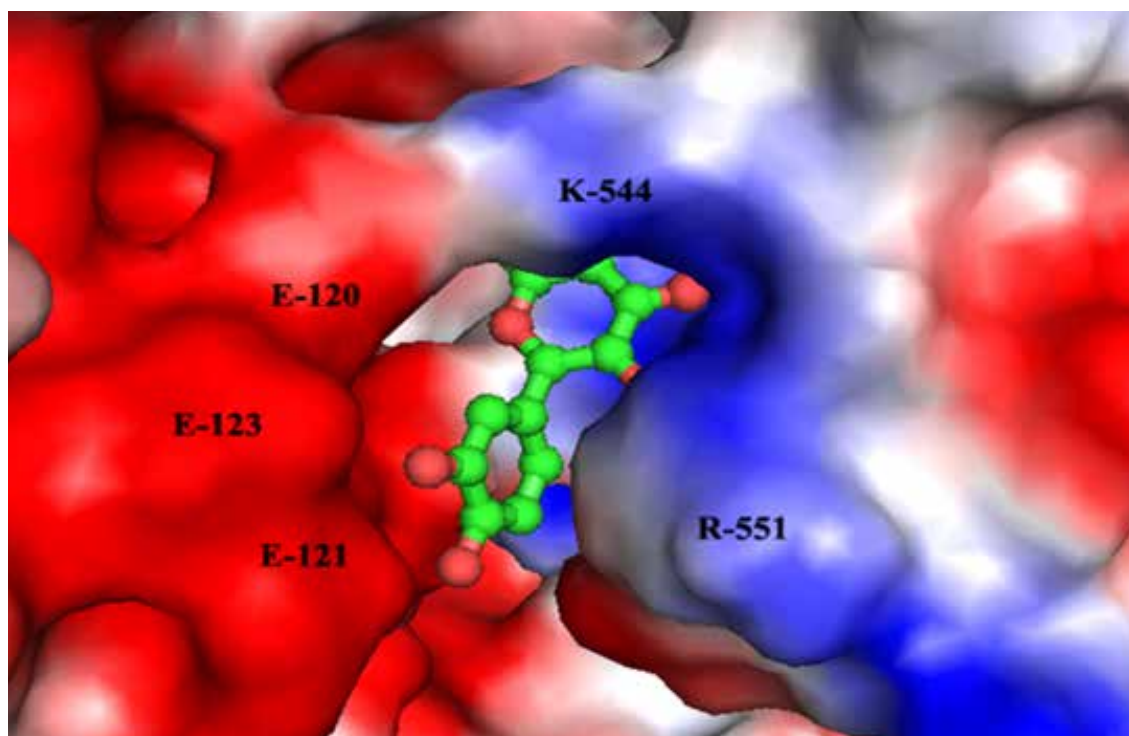
The experiments were conducted on the University of Thessaly farm in Velestino, at the Thessaly Technical Educational Institute (TEI) farm in Larissa, and in Komotini.

* Further information and results from the project can be found at www.biomass.agr.uth.gr



Creating a centre of excellence in structural biology and chemistry

The DESYNE programme aims to identify novel compounds as potential drug candidates for type 2 diabetes

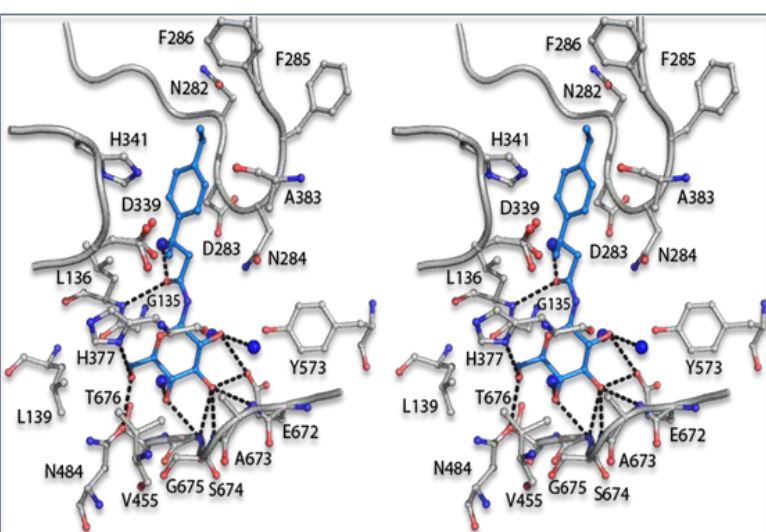


Conducted by the Laboratory of Structural and Functional Biochemistry of the Department of Biochemistry and Biotechnology and directed by Associate Professor Demetres D. Leonidas, the DESYNE programme aims to create a centre of excellence in structural biology and chemistry with an emphasis on structure-based drug design and discovery.

Structural methods provide key information for advancing biomedical research by elucidating structure-function relationships of macromolecules relevant to health, or pharmacological

development. In structure-based drug design, the structure of a ligand bound to a protein provides a detailed insight into the protein-ligand interactions to design changes to increase its affinity and specificity.

The overarching goal of the project is to identify novel compounds as potential drug candidates for type 2 diabetes mellitus. Glycogen phosphorylase and phos-



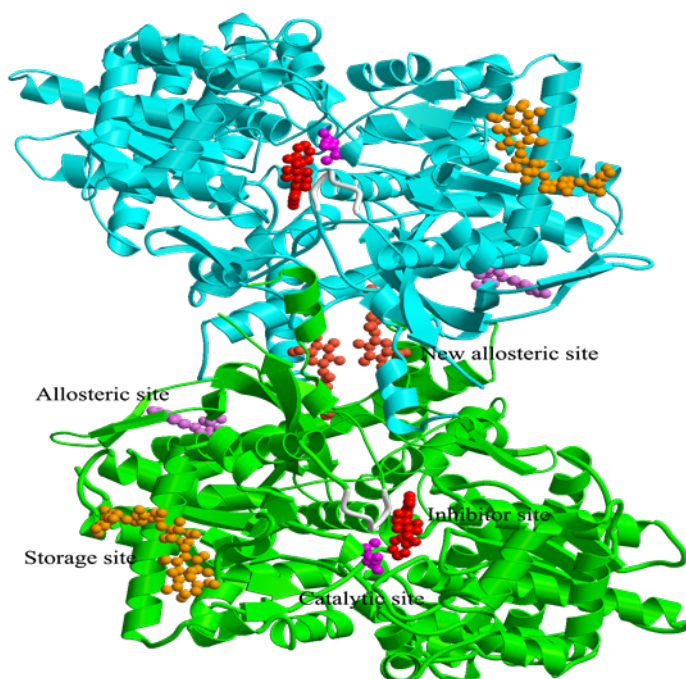
phorylase kinase will be targeted. These proteins have a central regulatory role in the metabolic pathways of glycogenolysis. The basic idea is to combine high-resolution structural information with computational approaches to guide the screening for the binding of several small compounds

to the selected proteins. On the basis of the results, new compounds will be synthesised and assessed *in vitro* and *ex vivo*.

The DESYNE programme is expected to produce a series of novel hypoglycemic compounds with better potency than those currently available. The project consists of six work packages:

- (i) the production of macromolecular targets;
- (ii) structural studies using X-ray crystallography, and EM data of protein-ligand complexes;
- (iii) *in silico* high-throughput screening of chemical libraries and structure-aided drug design;
- (iv) the synthesis of bioactive molecules;
- (v) *in vitro* and *ex vivo* evaluation; and
- (vi) dissemination activities.

The project is being conducted in collaboration with Prof Dimitris Komiotis, Laboratory of Bioorganic Chemistry, Department of Biochemistry and Biotechnology, University of Thessaly; Prof Lorraine Agius, Institute of Cellular Medicine (Diabetes), Medical School, University of Newcastle, UK; and Dr Joseph M. Hayes, School of Forensic Sciences, University of Central Lancashire, UK.



Sustainable crop production and environmental management

A novel postgraduate course in agriculture

[Department of Agriculture Crop Production and Rural Environment](#)



The Master of Science degree programme of the Department of Agricultural Crop Production and Rural Environment provides students with a range of study and research opportunities in many fields, including the following:

1. Plant breeding and plant biotechnology with emphasis on the production of propagating material, and food quality
2. Crop production and environment
3. Plant medicine/pathology and environment
4. Agricultural engineering and natural resource management
5. Environmental management

The postgraduate programme benefits from the department's 15 specially equipped laboratories and the expertise of its personnel, which includes 24 faculty and 7 laboratory teaching staff. In all, 50 courses are offered every year, in theoretical knowledge, laboratory exercises and educational field trips. In addition, postgraduate students conduct a portion of their research work on the University of Thessaly's farm in Velestino, as well as on other farms and in agricultural facilities in the Thessaly plain.

The department's postgraduate programme, entitled Sustainable Crop Production and Environmental Management, is aimed at equipping recent and also less recent graduates with up-to-date agronomic and environmental knowledge and skills in order to make them more competitive and attractive in the domestic and international private-sector job market and also to provide the public sector with better qualified experts. The programme also aims to provide graduates with a sound business sense so that they can take advantage of the opportunities provided by the agricultural sector. The third objective is to deepen graduates' theoretical foundations to better enable them to pursue PhD courses in Greece or further afield.

Some of the most important innovations of the department's graduate programme include offering a one-year intensive curriculum and a more traditional, less intensive course of two years' duration. The programme also benefits from a lecture series by distinguished invited academics, day seminars on selected issues of agricultural importance, and the continuous interaction between students, their supervisors and other department staff concerning the progress of their master's thesis.



Educating the educators of children

Masters offered by the Department of Early Childhood Education equips graduates with expertise in educational material and children's toys

[Department of Early Childhood Education](#)

The postgraduate programme Educational Sciences: Educational Material and Pedagogical Toys, run by the Department of Early Childhood Education, was first launched in 2004. The programme consists of four semesters (two years) of study, leading to the acquisition of a master's degree.

The programme aims at providing state-of-the-art, specialised knowledge on the design, use and evaluation of educational material and educational toys. Upon successful completion of the programme, graduates will have developed a reflective understanding of critical pedagogical, psychological and sociological aspects of education. More particularly, they will be able to

- design, implement and evaluate developmentally appropriate and innovative teaching and learning material
- formulate and refine a research problem by



creatively applying research and theories on children's growth and development, gather the necessary information to address it and formulate a conclusion which can be defended in an academic context

- develop research-informed, flexible learning environments, adapt and modify curricula to meet the personal needs of children from diverse cultural backgrounds and with diverse abilities.

Graduates of the programme make ideal recruits for early childhood educational centres. Furthermore, their acquired expertise enables them to work in

- publishing companies specialising in children's books
- companies that produce teaching and learn-





ing material, toys and software

- education-oriented institutions (such as museums, children's libraries, recreation centres, etc.)
- research institutions focusing on children's development and education, as well as on the development and evaluation of teaching material.

Successful completion of the programme requires the compulsory attendance of and successful examination in eight courses (of which six are required and two elective), as well as the attendance of two seminar cycles. In addition, students must submit a dissertation in order to qualify for their master's degree.

For more information, visit:

<http://bit.ly/1E2vbea>



MSc in Exercise and Health

Helping societies get fitter through physical activity and preventative health

[Department of Physical Education and Sport Science](#)

Provided by the Department of Physical Education and Sport Science, the MSc in Exercise and Health aims to produce hard-working, ambitious and goal-oriented graduates with special human and professional values who, by using their common sense and applied skills, will be both innovative and practical in promoting the importance of physical activity and preventative health for the well-being of modern societies.

That goal is achieved by

- Providing students with the necessary expertise so that they can manage the often demanding world of physical exercise, thus contributing to the enhanced quality of life both in their areas
- Covering relevant scientific findings from the realm of medicine, food production and new technologies
- Promoting the values of physical activity in the prevention, maintenance and promotion of health
- Promoting research in the area of sports science, thus contributing towards the production of new knowledge in the broader field
- Promoting the use of physical activity as a means to combat health issues
- Advancing collaboration in research and education with other academic institutions nationally and internationally
- Increasing the mobility of students and staff
- Attracting students and staff from abroad

The fees for the 18-month programme, which is conducted in both Greek and English, are €4,000.

* For more information on the programme, call: **+30-24310-47019**, email: msc@pe.uth.gr or visit www.pe-uth.gr/msc/

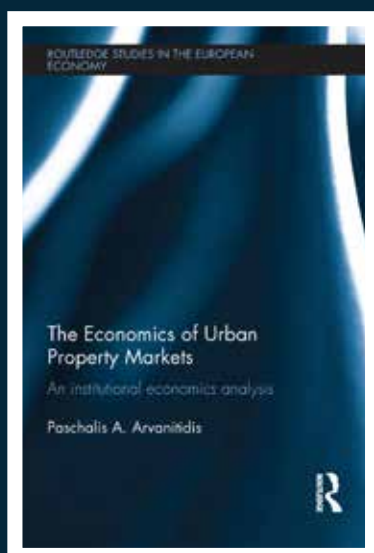


The property market and the urban economy

Economist Paschalis Arvanitidis sees in the property market a mediator for realising urban economic potential

Paschalis A. Arvanitidis

Assistant Professor Department of Economics University of Thessaly



The relationship between the property market and the urban economy is the subject of this book by Paschalis A. Arvanitidis, assistant professor of institutional economics at the University of Thessaly. The stimulus for the volume, entitled *The Economics of Urban Property Markets: An institutional economics analysis*, was provided by the seemingly ever-accelerating process of urban economic change and the noticeable failure of existing studies to adequately explore the pivotal role that the property market plays in this process.

Drawing on institutional economics, the central argument of the book is that the property market as an institution is a mediator through which urban economic potential can be realised and served. In developing this argument, the book provides:

- A critical realist ontological framework that advances understanding of the institutional structure of the economy and the complex interrelation between the institutional environment and human agency
- A holistic framework of urban economic change, where appropriate emphasis is placed on the specific mechanisms, processes and dynamics through which the built environment is provided
- An institutional economics conceptualisation of property market efficiency, defined in terms of the ability of the market institution to adapt its structure and to provide the outcomes that the economy requires
- A generic analytical approach specifying appropriate research methods and techniques for investigation of the concepts developed
- A specific research design providing an operational framework that translates developed theory into empirical practice

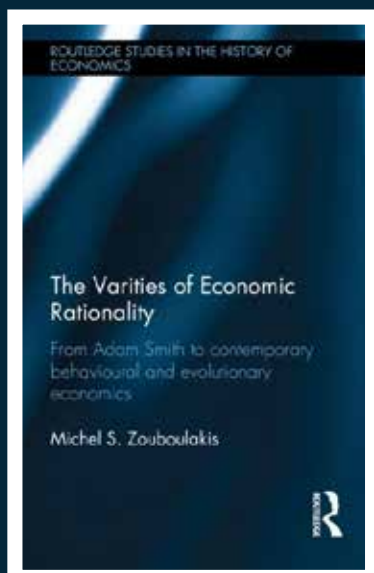
The book's primary contribution therefore lies in its delineation of a holistic research programme to conceptualise the property market as an institution and to explore its role within the urban economy.

Interpreting economic rationality

In his recent book, Prof Michel Zouboulakis traces the historical evolution of a key concept in economics

Michel S. Zouboulakis

Professor Department of Economics University of Thessaly



The concept of economic rationality is important for the historical evolution of economics as a scientific discipline. The common idea about this concept – even between economists – is that it has a unique meaning that is universally accepted.

This 2013 volume, authored by Michel S. Zouboulakis of the University of Thessaly, argues that “economic rationality” is not a universal concept with one single meaning, and that it in fact has had different, if not conflicting, interpretations in the evolution of discourse on economics.

In order to achieve this, Zouboulakis, a professor of history and methodology of economics, traces the historical evolution of the concept of economic rationality from Adam Smith to the present, taking in thinkers from Mill to Friedman, and encompassing approaches from neoclassical to behavioural economics.

His book, titled *The Varieties of Economic Rationality: From Adam Smith to Contemporary Behavioural and Evolutionary Economics* and published by Routledge, charts this history in order to reveal important instances of conceptual transformation of the meaning of economic rationality. In doing so, it presents a uniquely detailed study of the historical change of the many faces of the homo economicus.



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