

# Report on Bachelor Thesis

Institute of Economic Studies, Faculty of Social Sciences, Charles University

<b>Student:</b>	<b>Radim Král</b>
<b>Advisor:</b>	<b>PhDr. Jiří Kukačka, Ph.D.</b>
<b>Title of the thesis:</b>	<b>Nudging the Czech Pension System Towards Sustainability</b>

**OVERALL ASSESSMENT** (provided in English, Czech, or Slovak):

## Short summary

This thesis by Radim Kral investigates potential enhancements to the sustainability of the Czech pension system, focusing on the application of behavioral "nudges"—subtle suggestions that influence decision-making without restricting freedom of choice. Using an agent-based model tailored to the Czech context, the study extends existing models to include realistic consumption and saving behaviors, as well as a simplified version of the Czech voluntary-funded pension scheme. Initial findings indicate that under current conditions, nudges have a limited impact on improving pension system sustainability. However, as government incentives encourage higher savings and investment in better-performing funds or investment products, nudges become increasingly important, potentially mitigating nearly half of the current system's financial pressures. The thesis thus highlights the positive impact of nudges in pension reforms, particularly as a tool to enhance the effectiveness of governmental incentives in securing the long-term viability of the Czech pension system.

## Contribution

There are three main contributions of the thesis, mostly methodological. First, Radim innovatively applies agent-based methodology, which is valued for its flexibility, scalability, and adaptability to a specific context, to the study of the Czech pension system. While an agent-based approach to pension laws and social security policies was applied to countries such as Japan, Spain, and Russia, I am personally not aware of any similar application to the Czech environment. This brings the necessity to re-parametrize/re-calibrate a baseline model taken from literature, which Radim skilfully manages using various official sources such as MPSV, Czech Statistical Office, Ministry of Finance, Czech National Bank, and others. Second, Radim further extends and modifies the model by implementing the Permanent Income Hypothesis as the decision-making principle of economic agents. This is a significant methodological contribution, bringing the model much closer to reality compared to the original principle of myopic consumption satisfaction. To fit the Czech system better, Radim also implements the "third pillar" of Czech pensions, the voluntary funded pension (DPS, DIP). Last but not least (actually, the main motive of the thesis), Radim studies the impact of possible (mostly governmental) behavioral nudges on the sustainability of the system. Transferring the knowledge and research results about famous nudges applied around the world (automatic enrollment, forced choosing, save more tomorrow), Radim, in a stylized fashion, evaluates their impact in the context of the Czech system.

## Methods

The main advantage of agent-based modeling over typical pension systems modeling approaches (the overlapping generation model) is that it includes heterogeneous agents who can have individual-specific characteristics such as endowment and preferences and can interact with each other and their environment. This modeling approach brings many degrees of freedom and the so-called "wilderness of bounded rationality," which each modeler has to tame. I believe Radim managed this very well. This methodology completely surpasses the bachelor-level IES curriculum. Radim not only had to study the methodology itself but also to master the implementation of the model in the NetLogo software, together with related analytical tools for scenarios and sensitivity analysis. Implementation of the PIH then merges the agent-based methodology with bachelor-level macroeconomic concepts.

The re-parametrized/re-calibrated extended model had to be validated. That means ensuring its emergent outcomes fit patterns observed in reality. This is done via a comparison of the wealth distribution, the shape of the Lorenz Curve, and the Gini index.

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## Literature

The thesis first offers a summary of the design of the Czech pension system, focused on the mandatory PAYG contributions and the voluntary funded pension ("third pillar"). The literature section is then divided into three topical areas. The first is devoted to pension systems in general and the connection to the concept of nudges. The second is about the sustainability of the Czech pension system. The last summarizes the advantages of agent-based modeling. Overall, Radim demonstrates familiarity with the current literature on the analyzed topic. Finally, citations are appropriately done using a standard style for economic papers.

## Manuscript form

The thesis is written in decent English, standardly structured, and typeset in LaTeX. Most formatting comments from my side are considered in the final version. The bibliography section is complete and well-formatted. Referencing tables and figures is done correctly in the text, and both figures and tables are self-contained.

## Overall evaluation and suggested questions for the discussion during the defense

The assessed thesis fulfills the IES, Faculty of Social Sciences, Charles University bachelor-level standards. Thus, I can recommend it for the defense and suggest a grade of B.

The results of the Turnitin analysis do not indicate significant text similarity with other available sources.

Additional topics for the discussion:

- Can you suggest another potential measure/indicator of the sustainability of pension systems than the proportion of socially excluded agents? What modification to the model would be necessary to implement such an indicator?
- Incorporation of the PIH, although making the decision-making process about consumption and saving more realistic, still requires a set of simplifying assumptions. Can you elaborate on which of those are the strongest and which can be considered as reasonably close to satisfied?

## **SUMMARY OF POINTS AWARDED** (for details, see below):

<b>CATEGORY</b>	<b>POINTS</b>
<i>Contribution</i> (max. 30 points)	29
<i>Methods</i> (max. 30 points)	26
<i>Literature</i> (max. 20 points)	16
<i>Manuscript Form</i> (max. 20 points)	17
<b>TOTAL POINTS</b> (max. 100 points)	<b>88</b>
<b>GRADE</b> (A – B – C – D – E – F)	<b>B</b>

**NAME OF THE REFEREE: Jiří Kukačka**

**DATE OF EVALUATION: 26. 5. 2024**

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**Referee Signature**

**EXPLANATION OF CATEGORIES AND SCALE:**

**CONTRIBUTION:** *The author presents original ideas on the topic demonstrating critical thinking and ability to draw conclusions based on the knowledge of relevant theory and empirics. There is a distinct value added of the thesis.*

**METHODS:** *The tools used are relevant to the research question being investigated, and adequate to the author's level of studies. The thesis topic is comprehensively analyzed.*

**LITERATURE REVIEW:** *The thesis demonstrates author's full understanding and command of recent literature. The author quotes relevant literature in a proper way.*

**MANUSCRIPT FORM:** *The thesis is well structured. The student uses appropriate language and style, including academic format for graphs and tables. The text effectively refers to graphs and tables and disposes with a complete bibliography.*

**Overall grading:**

TOTAL	GRADE
91 – 100	A
81 - 90	B
71 - 80	C
61 – 70	D
51 – 60	E
0 – 50	F