

## Ph-D position, Le Mans University

**Subject:** Sustainability of social protection systems in an aging economy

**Duration:** 3 years, Le Mans (France)

### Supervisors

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### Subject

The future of the social security system (pensions, health, dependency) and the emergence of new risks for individuals (health, income, polarization of employment, etc.) are common features in most developed countries. In a context of an aging population and considering the inequalities individuals experiment as regards these different risks, the social security system faces an increase in costs and uncertainties concerning economic growth (possibility of secular stagnation, uncertainty about available energy resources and therefore the sustainability of growth). There is an increasing demand for insurance (public and / or private) potentially very expensive and a divergence with the growth rate of the economy.

The objective of this research project is to provide a theoretical and quantitative analysis of the consequences of health risks, dependence and aging in an increasingly uncertain economic context and to propose measures to ensure sustainability and the sustainability of the social protection system.

The research program starts from several considerations.

1) The lengthening of the lifespan and the demographic evolution, which induces the aging of the population. This is an important challenge, since small variations in demographic trends can significantly affect the sustainability of the social protection system (unemployment, retirement, health). The issue of dependency and its financing is also in full development.

2) An environment characterized by new risks. Structural changes in the labor market such as job polarization are now well documented. We observe the development of "abstract" jobs and "manual" jobs (at the extremes of the wage distribution) and the decrease in "routine" jobs (at the center of the distribution). This results in a significant heterogeneity of individuals in their career paths and in their choice of savings. The same goes for exposure to the various health and longevity risks, which condition the time spent in employment, retirement or dependency.

3) A modeling of decisions in an uncertain universe and the model uncertainty. Agents must make decisions in a context where there are many sources of uncertainty and the model is misspecified.

The thesis should shed new light on the sustainability of the social protection system (unemployment, pensions, health insurance, long-term care) and its financing, paying particular attention to the analysis of heterogeneous individual decisions regarding the supply of work or decisions in retirement, medical care, savings and insurance.

### Work program :

- Comparative survey of the existing social protection systems (France, or comparison across several countries).
- Referencing new risks based on microeconomic data. The same goes for the wealth and heritage of individuals.
- Highlight the weaknesses of existing social protection systems and propose policies or measures to remedy them. For this, we will use models with heterogeneous agents. These models will be calibrated or if possible estimated on microeconomic data.

The doctoral student will acquire and use recent developments in decision theory, mathematical models of stochastic control as well as adequate numerical and econometric methods. A large investment in the literature of dynamic models with heterogeneous agents will therefore be necessary throughout the three years.

The doctoral student must produce at least three articles in international peer-reviewed journals.

### References

Kaplan, G., Moll, B., and Violante, G. «Monetary Policy According to HANK», Mimeo, 2017.

Carvalho, C., Ferrero, A. and Nechio, F. «Demographics and Real Interest Rates: Inspecting the Mechanism», FEDERAL RESERVE BANK OF SAN FRANCISCO WORKING PAPER SERIES, Working Paper 2016-05.

Carvalho, C. and Ferrero, A. «Monetary Policy and the Demographic Transition», Mimeo, 2012.

De Nardi, M., Imrohroglu, S., and Sargent, T., « Project US Demographics and Social Security », Review of Economic Dynamics, 1999.

Achdou, Y., Han, J., Lasry, J\_M., Lions, J-M.,and Moll,B. « Income and Wealth Distribution in Macroeconomics: A Continuous-Time Approach, » NBER Working Papers 23732, National Bureau of Economic Research, Inc, 2017

### The team GAINS

The scientific strategy of the GAINS is based on two axes.

#### Axis 1: Evaluation of public employment policies

The objective is the development of new theoretical and quantitative tools to contribute to the debate on the effectiveness of public policies, and more particularly those related to employment (reforms of labor market institutions, taxation or training). This research meets the demands of the public authorities and is rooted in controversial issues, both at the theoretical and applied level. The GAINS team is part of the TEPP Federation (CNRS).

#### Axis 2: Risk, insurance and social protection

The objective is to study the behavior of economic agents in presence of uncertainty. Two dimensions are favored: (i) the perception and coverage of risks; (ii) the management of occupational risks. This research responds to a strong social demand around social protection systems, such as retirement, health insurance, or unemployment insurance. The problem of risks (of different natures) and their management occupy an increasing place in contemporary economies.

The GAINS is part of the Institute of Risk and Insurance of Le Mans, founded jointly with the Mathematics department and the Law department. It also participates to the theme of the "International Longevity Economy" network ("Demographic Transition, Economic Transition" chair, Risk Foundation - Louis Bachelier Institute) since 2017.

For any extra information: [dir-gains@univ-lemans.fr](mailto:dir-gains@univ-lemans.fr) .

### Application

Please send

- your CV,

- a description of your MASTER courses, with your results, projects and master dissertation,

- letters of recommendation.

before **01 June 2021**

Pre-selected candidates will be auditioned online or in le Mans if possible, in June 2021.