**Project title: Subjective expectations and optimal savings path**
**Principal investigator: María José Prados (University of Southern California)**

Research shows that retirement security is a major concern for many Americans. But since retirement planning is often a difficult task, many households reach that period in their lives with varying degrees of preparation. Research also shows that before retirement many people do not understand their future Social Security benefits. Biased beliefs or lack of information about retirement can lead to suboptimal consumption and savings choices and welfare losses. Indeed, many households reach retirement poorly prepared, some face substantial shortfalls in retirement savings – especially the lower income and less educated – while others accumulate too much private savings. Government provided social insurance plays an important role in this context.

The goal of this project is to quantify the relative importance of the main factors that affect retirement savings and the insurance role of Social Security during retirement in the U.S. For this, we develop a rigorous quantitative analysis that combines unique survey data with a standard lifecycle optimization model with uninsurable risks to measure the role of Social Security literacy, subjective expectations about future income and medical expenses, and underlying behavioral traits, as determinants of lifecycle consumption and savings.

To quantify the model, we combine public sources of data with a survey we designed for this project. We collected data on subjective expectations and other information to inform specific moments of the model. We can measure the correspondence between subjective beliefs and objective empirical distributions. The quantified model serves to compare welfare between realized and optimal savings paths, and to assess the importance of subjective expectations and behavioral factors in determining savings dynamics and welfare. This framework can be used to perform policy counterfactuals.

***Methodology:*** We assume the following household optimization problem: households choose how much to consume and save to maximize the present discounted value of expected lifetime utility, subject to their expectations in terms of future earnings and assets, retirement age, medical expenses during retirement and bequest motives. Subjective expectations about future earnings include expectations about Social Security retirement benefits and any retirement plan they may be enrolled in.

In the subjective expectations specification, the information set of the household need not match the actual functional form of social security benefits, or statistical evolution of labor earnings. Instead, it contains the elicited information about the subjective expectations of the households with respect to their future labor earnings, social security benefits, other retirement benefits, medical spending, and about the level of assets they intend to accumulate by retirement time, measured in our survey responses. We compute the optimal savings paths under subjective and rational expectations.

The subjective expectations module in our survey uses a framework close to Dominitz and Manski (1997, 2006) to elicit information about the probabilistic expectations of future

events: The survey elicits information on the support of the distribution and the probability mass in each of five intervals within that support. Thus, for each household, we obtain the integrals of the subjective probability density function over intervals of the support.

We calibrate the model to our UAS sample and compute the optimal savings decision rule for each household under their subjective expectations. We assess the relevance for household wealth dynamics of expectations bias by comparing the predictions of this model to those from a lifecycle optimization model with rational expectations. Additionally, the observed path of savings may differ from the optimal decision rule derived from the subjective expectations model. Hence, we use our survey information to identify the relevant behavioral factors explaining these deviations. By comparing the respondents' actual wealth position with what the perfect information model predicts and what the model with subjective expectations predicts, this approach allows us to measure the welfare consequences of misinformation and behavioral factors, as well as the insurance effects of Social Security benefits. This allows us to identify potential interventions.

***Quantifying the model:*** For the rational expectations specification, we estimate statistical processes to predict future household earnings and medical expenses. We combine the earnings and work history collected in our survey with the predicted future household earnings to compute expected future Social Security benefits for each household. We assess heterogeneity in biases and effects using demographics information form the survey data.

***Data:*** We use a combination of data sources. For this project, we designed a survey module of the Understanding America Study (UAS). The UAS is an Internet panel managed by the University of Southern California, of approximately 6,500 individuals who represent the entire U.S. We collected information on subjective expectations about future labor earnings, Social Security retirement benefits, retirement plans balances, and medical expenses; propensity to plan, and earnings history. We link this information to household demographics and economic and behavioral variables from other UAS modules. We use the Panel Study of Income Dynamics to estimate earnings processes over the lifecycle and the Medical Expenditure Panel Survey to estimate the distribution of medical spending.

***Outcome and relevance:*** Preliminary results from our recently collected data indicate large heterogeneity in expectations and planning behaviors: more than half of our non-retiree sample does not have an estimate of their future Social Security benefits, 12% expects to receive Social Security benefits above the current maximum and 51% reports not planning for their savings. A regression analysis confirms an association between wealth accumulation prior to retirement and subjective expectations about retirement characteristics (benefits, age at retirement, etc) and future earnings.

The quantified model will have policy implications relevant to retirement welfare. We can measure the level of support that Social Security currently provides for retirement security to different population subgroups (e.g. by education level, income). Lastly, we can assess welfare consequences of changes in policies or behaviors.

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## Budget

The data for this project is currently being collected. The project would greatly benefit from funding for a graduate research assistant. The graduate research assistant would collaborate in the following tasks: data cleaning and processing, estimation of lifecycle profiles of medical expenses and earnings, and matching model moments to the data.

The budget allocates the effort of a graduate research assistant from the Economics department at 40% during the Summer Term 2017 and 50% during the Fall 2017. Given the current rate for a graduate student at USC, the total cost of the GRA is $19,933. No fringe benefits apply.

| | | |
|---|---|---|
| **GRA (PhD student)** | | |
| Name 1 (TBD) | 40% Summer 2017 | $6,933 |
| | 50% Fall 2017 | $13,000 |
| **Total, USC Compensation** | | **$19,933** |

**María José Prados**
March 2017

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## Professional Experience

University of Southern California, Center for Economic and Social Research: Economist, 2015-present
University of Southern California, Department of Economics: Lecturer, Spring 2017.
University of Southern California, Schaeffer Center: Postdoctoral Research Scholar, 2013-2015.

## Education

Columbia University, New York, Ph.D., Economics, 2014
Universidad Torcuato Di Tella, Buenos Aires, Postgraduate studies, Economics, 2006
Universidad Nacional de Cuyo, Mendoza, B.A., Economics (*magna cum laude*), 2004

## Fields of Specialization

Lifecycle dynamics, inequality, health, labor economics, quantitative models with heterogeneous agents.

## Peer-Reviewed Publications

"Gender and Dynamic Agency: Theory and Evidence on the Compensation of Top Executives", *with Stefania Albanesi and Claudia Olivetti*. *Research in Labor Economics,* 2015, 42:1-60. (2015)

## Working Papers

"The Life-cycle Benefits of an Influential Early Childhood Program" *with Jorge L Garcia, James J Heckman, and Duncan Leaf* (submitted)

"Health and Earnings Inequality over the Life Cycle: The Redistributive Potential of Health Policies" (submitted)

"Slowing Labor Participation of Married Women: The Role of Increasing Income Inequality" *with Stefania Albanesi.*

"Education as a Health Disparities Intervention" *with Julie Zissimopoulos and Dana Goldman.*

## Work in Progress

"Subjective Expectations, Social Security Benefits, and the Optimal Path to Retirement" *with Arie Kapteyn*

"Alternative formats to elicit subjective expectations about future labor income"

"Fertility Innovations and Female Human Capital Investment"

"Gender Gap in Earnings Dynamics"

## Research Grants and Funding

NIA P30AG024968 (Goldman)- Roybal Center for Health Policy Simulation
Title: Can Education Reduce Racial and Ethnic Health Disparities?
Role: PI (pilot)
06/2016-05/2017

NIA P30AG024962 (Kapteyn) - Roybal Center for Health Decision Making and Financial Independence in Old Age
Title: Knowledge, wealth management and retirement
Role: Co-PI (pilot)
10/2016-05/2017

NIA P30AG043073 (Goldman) -USC Resource Center for Minority Aging Research (USC-RCMAR)
Title: Assessing the role of education and health interventions to reduce old-age health disparities
Role: RCMAR Scholar
08/2015-07/2016

**Invited Seminars and Conference Presentations**

2017: Meeting of the Roybal Center for Decision Making (planned), Bank of Spain (planned)
2016: Annual Meeting of the AEA (San Francisco), RCMAR Annual Investigators Meeting (NIH Bethesda, poster), Southern Economic Association (Washington DC), MacArthur Foundation Aging Society Network meeting (Los Angeles)
2015: University of Southern California Marshall School of Business, CREA-HCEO-MOVE Barcelona GSE Summer Forum.
2014: North American Summer Meeting of the Econometric Society (University of Minnesota), University of Southern California CESR.
2013: McGill University, University of Notre Dame, Board of Governors of the Federal Reserve System, Bonn University, Mannheim University, Goethe University Frankfurt, Universidad Carlos III Madrid, University of Southern California Schaeffer Center, Pontificia Universidad Católica de Chile, Latin American Meeting of the Econometric Society (Mexico City), Latin American and Caribbean Economic Association Annual Meeting (Mexico City)
2012: Midwest Macroeconomics Conference (Notre Dame), Annual Conference of the Society of Economic Dynamics (Limassol), MOOD Doctoral Workshop at the Einaudi Economics and Finance Institute (Rome).
2011: Federal Reserve Bank of New York.

**Visiting Positions and Workshop Participation**

Einaudi Institute for Economics and Finance: Visiting Scholar (June 2016, 2017)
Einaudi Institute for Economics and Finance, MOOD Doctoral Workshop: participant (2012)
Federal Reserve Bank of New York, CSWEP Summer PhD Dissertation Fellowship (2011).
University of Chicago Institute on Computational Economics, participant (2010).

**Professional Services**

*Referee for:* American Economic Review, American Economic Journal: Microeconomics, Journal of the European Economic Association, Journal of Monetary Economics, Journal of Labor Economics, Review of Economic Dynamics, Southern Economic Journal, Labour: Review of Labour Economics and Industrial Relations, The Manchester School, National Science Foundation.

**Honors and Awards**

RCMAR Scholar (Minority Aging Health Economics Research Center at USC, 2015-2016)

Postdoctoral Scholar Travel & Training Award, USC Office of Postdoctoral Affairs (2014).

PER Graduate Summer Fellowship, Columbia University (2009, 2010).

Fellowship, Columbia University (2006-2013).

Scholarship, Universidad Torcuato Di Tella (2004, 2005).

Distinction, Argentinean Federation of University Women (2005).

Magna cum laude, Valedictorian and Honor Distinction, Universidad Nacional de Cuyo (2004).

Highest GPA Distinction, Universidad Nacional de Cuyo (2001, 2002, 2004).

High Academic Performance Fellowship, Universidad Nacional de Cuyo (2001, 2002).

**Teaching**

University of Southern California, Los Angeles, 2017
Instructor, undergraduate level: Economics of Health Care.
Columbia University, New York, 2007-2012

Assistant, undergraduate level: Principles in Economics, Global Economy, International Monetary Theory and Policy, Gender Economics, Money and Banking.

Universidad Torcuato Di Tella, Buenos Aires, Argentina, 2004-2006

Assistant, graduate level: Mathematics for Economists, Macroeconomics I.

Assistant, undergraduate level: Macroeconomics I, Law and Economics.

Universidad Nacional de Cuyo, Mendoza, Argentina, 2001-2003

Assistant, undergraduate level: Monetary Economics, Economic Feasibility Analysis.

Universidad de Congreso, Mendoza, Argentina, 2003.

Assistant, undergraduate level: Economics I, Economics II.

**Languages:** Spanish (native), English (fluent), French (intermediate), Portuguese (intermediate).