Pablo WINANT

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1. EDUCATION

- 2007-2014: PhD at Paris School of Economics.
- 2007: Master of Science in Probabilities and Applications at Paris 6 University (first year).
- 2005-2006: Master of Science in Economic Policies Analysis at l'Ecole Normale Supérieure in Paris, specialized in macroeconomics and finance.
- 2003-2008: Full grant of the Ecole Normale Supérieure de Lyon.

2. PROFESSIONAL EXPERIENCE

- 2016-2018: Research Economist at the Bank of England.
- 2013-2015: Economist at the International Monetary Fund. Systemic Issue Division.
- 2012-2013: Research Fellow at London Business School.

3. TEACHING EXPERIENCE

- 2017: Joint Research Center (Ispra). *Introduction to model estimation with Julia.*
- 2017: PanoRisk Summer School. *Choix de portefeuille stratégique: théorie, méthodes et applications.*
- 2017: Paris School of Economics Summer School: *Computational Economics and Nonlinear Modeling.*
- 2017: Australian Central Bank and New-Zealand Central Bank. *Julia Programming. Advanced Topics.*
- 2011, 2012: T.A. in *macroeconomics* at Ecole Polytechnique (4th year undergraduate)
- 2008, 2010 (first semester): T.A. in *international trade* at Paris 5 (3rd year undergraduate)
- 2006-2008: oral examinations in *mathematics* at Lycée Saint Louis (1st year undergraduate)
- 2007: T.A. in *mathematics* at Université Paris Dauphine (2nd year undergraduate)

4. ACADEMIC ACTIVITIES

Referee reviews: Journal of Economic Dynamics and Control, Journal of International Economics, IMF Economic Review, Journal of Business and Finance, Journal of Economic Behaviour, Journal of International Money and Finance, Economic Inquiry, Applied Economics, Data in Brief.

Conferences: AEA Winter meetings 2011, CEF 2013, CEF 2014, CEF 2016, SED 2017, CEF 2017, EEA 2017, AEA Winter Meetings 2017, CEF 2018, PASC 2018.

Seminars: NYU Abhu Dabi 2014, Berlin DIW 2016, University of Surrey 2016, University of Bath 2017, New York Fed 2017, University of Alicante 2018

5. PUBLISHED AND CONDITIONALLY ACCEPTED PAPERS

- *"A LARCH (∞) Vector Valued Process"* with Paul Doukhan and Gilles Teyssière, *Lecture Notes in Statistics, Springer, June 2006*

  We introduce a vector version of the $ARCH(\infty)$ equation yielding a simple approach to various models like bilinear or GARCH models. To this aim we provide an explicit chaotic expansion of a solution for this LARCH equation, and show the uniqueness of this solution under reasonable conditions. Independent or N-Markov approximations of this process allow to simulate their trajectory or to derive bounds for their weak dependence coefficients as defined by Doukhan and Louhichi (1999). We finally consider a long range dependent version of this model; in this case we provide an existence and uniqueness result.

- "*The Risky Steady State*" with Hélène Rey and Nicolas Coeurdacier, *American Economic Review P&P, April 2011.*

  We propose a simple quantitative method to linearize around the risky steady state of a small open economy. Unlike when the deterministic steady state is used, the net foreign asset position is well defined. We allow for stochastic income and stochastic interest rate.

- "*Inequality, leverage and crises*" with Michael Kumhof and Romain Rancière, *American Economic Review, 2015.*

  We explain the link between rising inequalities in the United States and the probability of a crisis. Our model replicates the evolution of the loan to income ratio of the bottom 95% income as well as the probability of crises. The crisis event is modeled as a strategic default by workers when debt is too high, while the debt accumulation is the result an unexpected inequality shock amplified by preference for wealth on the investor's side.

- *"Managing Capital Outflows with Limited Reserves"*, with Suman B. Basu, Atish R. Ghosh, and Jonathan Ostry. *IMF Economic Review, 2018*

  We analyze the optimal intervention policy for an emerging market central bank that wishes to stabilize the exchange rate during a capital outflow episode, but possesses limited reserves. Using a linear-quadratic framework, we show that the zero lower bound on reserves generates a time inconsistency problem. A central bank with full commitment achieves a gradual depreciation to the pure-float level by promising sustained future intervention, such that reserves are exhausted after particularly adverse shocks. A central bank without commitment intervenes little, wishing to preserve some reserves forever, and suffers a larger immediate exchange rate depreciation and associated welfare cost. For more persistent shocks, the time inconsistency problem is greater, and simple intervention rules can achieve welfare gains relative to discretion.

- "*Financial integration in a risky world*" with Nicolas Coeurdacier and Hélène Rey, *Revision requested at Journal of Monetary Economics.*

  We revisit the question of the gains from financial integration by exploring the interaction between two effects that have so far been studied separately: gains from risk sharing and gains from efficient capital allocation when a country is relatively capital-scarce. Using a dynamic model with incomplete markets and country-specific aggregate risk, we show that the hedging demand from the riskier country can produce flows of funds towards the safest country in the short run while these flows are eventually reverted when the riskier country has accumulated enough debt. When this effect dominates our model can produce growth impeding financial integration.

6. WORKING PAPERS

- "*Back in Time Fast. Improved Time Iterations.*"

  We present a modified version of the time iteration algorithm, inspired by Howard steps for the Value Function Algorithm. We show, that it performs several order of magnitude faster than standard iteration. A variant of this algorithm can also be used to measure numerically the spectral radius of the time-iterations.

- "*Dynamic portfolios*"

  I use the bifurcation theory to characterize dynamic portfolio choices in a DSGE model. It provides theoretical support for the recent methodology developed in Devereux and Sutherland (2009) and by Tille and Van Wincoop (2010). While the original method was restricted to general equilibrium models with two or more agents, the bifurcation approach can be applied to partial equilibrium settings where interest rates are exogenous. I illustrate this point by approximating the strategic asset allocation for a long term investor with intermediate consumption and compare its accuracy with a global solution.

- *"A model of external debt and international reserves"* with Raphaël Espinoza

  Using panel data for 138 low-income and middle-income countries over the period 1967-2012, we find that central bank reserves are most often used after terms of trade shocks. Hence, we model the optimal asset-liability decisions of a country assuming it faces risks of exogenous external shocks. External borrowing finances a scale-up in public capital. The optimal levels of external debt and of the stock of capital are functions of the productivity of capital, of the cost of financing, and of the welfare losses generated by external shocks. These losses depend on the probability and the extent of a balance of payments crisis, on risk aversion, and on short-term debt. Reserves are accumulated to reduce the welfare losses. However, because external debt is endogenous, the choice of reserves and of external debt is a joint decision. In particular, additional reserves reduce the cost of a crisis and increase the level of debt, of the capital stock, and of income.

- *"Deep Learning for Solving Dynamic Economic Models"* with Lilia Maliar and Serguei Maliar

  Much of recent progress in machine learning came from deep learning--a set of techniques for manipulating multi-layer neural networks. Deep learning provides immense capacities for data mining; it successfully performs tasks that were thought unique to human such as face, speech and object recognition; Facebook's News Feed use machine learning to deliver personalized feed to each member; robo-advisors manage clients portfolios; AlphaGo software developed by Google DeepMind displaced human Go players, etc. The goal of this paper is to demonstrate that deep learning techniques can be also used to analyze rather complex economic models in a simple and general manners. We first show how to cast the typical dynamic economic model into the form that is suitable for deep learning analysis. We next design a version of deep learning algorithm that can construct a numerical solution to the model. We finally describe a methodology for assessing the quality of solutions. Our examples include the stylized neoclassical growth and new Keynesian models. Our codes are written in python and rely on Google TensorFlow library.

- "*Income Inequality and Current Account Balances*" with Michael Kumhof, Ezgi Özsogut, Romain Rancière, Alexander Richter and Nathaniel Throckmorton.

  Current account regressions show that when top income shares are added to the comprehensive set of conventional explanatory variables used by the IMF, they predict significantly larger current account deficits in a cross-section of advanced economies, but with important outliers among countries that have pursued export-led rather than finance-led growth strategies. To study this mechanism, we develop a DSGE model where the income share of top earners increases at the expense of bottom earners. Due to preferences for wealth, top earners have a much higher marginal propensity to save than bottom earners, as they do in the data. We find that, when the re-distributive shock has a large positive effect on asset values, and if domestic financial markets are large, the result will be a sizable current account deficit. On the other hand, when the re-distributive shock mostly affects relative labor incomes, and if domestic financial markets are small, the result will be a current account surplus.