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Course on Financial Stability

Opening Remarks

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Welcome Remarks

- Good morning ladies and gentlemen, I am very pleased to welcome you all here today to the Course on Financial Stability. We have a distinguished group of experts from the academia who will share their perspectives and knowledge on financial stability.
- I would first like to thank our lecturers: Professor Dimitris Tsomocos, from the University of Oxford, who really needs no introduction, as well as Mr. Mark Flood, Professor at Maryland University and former OFR Research Principal, and Professor Marco van Der Leij, Associate Professor at the University of Amsterdam. They are leading facilitators of this newly designed course, which will focus on DSGE models for financial stability purposes. The course also features visual and analytical financial stability tools, and network analysis for financial stability.
- In addition, I would like to thank our local organizers, in particular, Serafin Martínez and his team, as well as our IT and administrative staff.
- We hope that this Course becomes a reference across the region and, more importantly, contributes to train our Membership with the analytical capacity to better deal with the new challenges in financial stability analysis and monitoring.

Introduction

- After the Global Financial Crisis (GFC), a wide consensus on the importance of financial stability began to form. This has taken place at the national, regional, and international levels. Moreover, this keen interest is shared by policy makers as well as academics.
- Nevertheless, this undeniable importance was less recognized before the GFC, as has been argued elsewhere.[1]
- Among some of the most relevant aspects that have been discussed (e.g., see Ramos Francia (2019)), we first find a lack of acknowledgement of the financial channel´s relevance and its absence in most macroeconomic models.
- As a second aspect, there was little recognition of the high level of interconnectedness in the financial system. These two aspects will be covered by our lecturers.

[1] Ramos-Francia (2019) during his opening speech at the CEMLA's IX Financial Stability Meeting

- In this context, Professor Tsomocos has been developing Dynamic Stochastic General Equilibrium (DSGE) models, featuring key components such as agent heterogeneity, uncertainty, endogenous default, incomplete financial markets, and liquidity constraints. These are useful to analyze financial fragility, interbank linkages and contagion.
- During the course you will study the Bank of Chile and the Bank of Greece Case Studies', for which Professor Tsomocos will share with us his valuable experience.
    - In the case of Chile, in Kazakova et al. (2018), based on a DSGE model for a small open economy with heterogeneous banking sector, the authors study financial stability in the presence of financial frictions (liquidity constraints and default) and real economy shocks (copper price).
    - For the case of Greece, using a Real Business-Cycle (RBC) model explaining that the efficient use of funds from debt relief can have positive effects on both debtors and lenders. Such effects depend on a sensible positive profitability of future investments by the debtors, as well as their willingness to use these funds in such investments, as explained in Goodhart et al. (2016)
- There is also an important gap on the evaluation of regulatory measures using general equilibrium models. For instance, in Goodhart et al. (2013), the authors explore the interactions of different financial regulations and their impacts on financial stability and wealth. We are looking forward to hear from Professor Tsomocos on this approach too.
- I have the conviction that this material will provide participants with a solid framework to study financial stability.
- In my following remarks, I would like to highlight two broad themes that will be covered in the course: first, interconnectedness and second,

Interconnectedness

- Allow me then to underscore the following aspects on interconnectedness.
- Broadly speaking, the analysis of interconnectedness and interdependencies across various markets and activities (layers) has gained prominence in financial stability. This is nowadays commonly done with focus on systemic risk. In effect, the GFC revealed how interconnected the financial system really is. This had led to consider interconnectedness as a central feature for financial stability analysis and monitoring.
- **Moving on to more specific aspects:**
    - **First**, a key one that the GFC also revealed is that the supervisory data to evaluate and monitor interconnectedness in the financial system were simply not there when it was most needed. Opportunely, many financial authorities around the globe have already started to fill this important data gap.
    - **Second**, since the aftermath of the GFC, researchers started to enhance interconnectedness measures to improve our understanding of the evolution of the financial system's structure. This has mainly entailed a systemic risk perspective. Notwithstanding, the complexity in financial markets keeps challenging researchers and policy makers alike. This pushes them to constantly improve their methodological and

analytical tools, and will allow all to better understand interdependences and connections across various markets and activities.

- As an example of such a process, let me mention that in Battiston and Martinez-Jaramillo (2018). They highlighted the importance of rethinking how to model financial contagion considering various channels through which financial shocks are transmitted. In short, one should always consider how different layers of financial systems are interconnected.

- **Third**, financial distress can be transmitted not only by direct losses but also by increasing funding rates and haircuts, and/or by reducing funding availability, and/or through asset fire sales. More empirical and theoretical work is needed to understand how financial distress is transmitted through different layers in financial systems and, in turn, to the real economy.

    - Being more concrete, in a banking system, there are multiple interactions between the different layers. Thus, it is challenging to measure the level of contagion. In this context, Poledna et al. (2015) propose a novel model to estimate systemic risk in the Mexican Banking system. They take a multilayer network approach and they found that systemic risk is consistently underestimated if only a single layer approach is used instead.

- Fourth, financial contagion is central for measuring systemic risk because of the amplification of initial shocks and its potential transmission through the financial system. Having said that, interconnectedness is not always bad. For instance, Martinez-Jaramillo et al. (2019) discuss cases in which higher connectivity is a positive feature from a financial perspective.

- I expect a lively exchange of ideas, and methodological points of view in the field, which have proven to be important to understand issues as market liquidity, contagion channels, stress testing and to quantify systemic risk.

Financial stability visualization and agent-based modelling

- As a second broad topic, allow me to make some remarks on Financial stability visualization and agent-based modelling.

    - **First**, in many jurisdictions there has been an increasing effort to monitor financial stability. There are many approaches and useful tools to do so. We will be glad to hear from Mark Flood his insights as a practitioner at the Office of Financial Research in the US.

    - **Second**, some of the emergent factors that could potentially lead to financial instability are endogenous. Thus, good theoretical models, which also consider its endogenous nature, are being designed. However, there is still much work to be done.

    - **Third**, a way to face some of these limitations, agent-based Modeling has been proposed. This has proven to be a useful methodology in many fields[2] and also in economics and finance where agents are conceived as computational intelligent units.

[2] Agent-based modelling is not exclusive of economic and finance applications. It is possible to find AB modelling in applications like pedestrian and traffic modeling, disease dynamics, drug development, energy flows in the power grid, etc.

The Agent-based Computational Economics (ACE) approach is a field of research based on a "bottom-up" approach. This helps to explain, from micro interactions among economic agents, the macro dynamics of the economy.

- In this context, Martínez (2007), highlights the importance of the design of agents' strategies. Among such design choices are: i) the decision- making process, the objective function, iii) the different levels of heterogeneity; and the learning mechanism. For instance, one of the most important results in Martinez (2007) is that the greater the agents' heterogeneity the better the artificial financial market replicates key statistical properties of stock prices.
- We expect that Mark's expertise in this field can be useful in the context of systemic liquidity stress testing.

Final remarks

- Let me conclude by briefly walking you over the contents we have set for this Course.
- Today, the first sessions will review first the modeling of liquidity, default and financial stability in general equilibrium; and second, an integrated framework for analyzing multiple financial regulations. The afternoon's third and fourth sessions will be addressed to financial stability analytics, complemented by data visualization and financial stability.
- Tomorrow, we will start with session five, liquidity and default in an exchange economy. After the morning break, session six will be focused on Debt, recovery rates and the Greek dilemma. For session seven, we will continue with an interesting topic about stress testing and financial stability, we are sure that this will be a very fruitful theoretical model for all of us. We will close second day with session eight will be allocated to review the Agent-based modeling and market liquidity.
- Lastly, the final day will start with session nine, where Professor Tsomocos will present General findings of the model, Calibration and Results. Chile Case study. Session ten will introduce us on Sovereign Credit Risk, Financial Fragility and Global Factors. After the lunch, we will have the session eleven a brief introduction to financial networks and the construction of financial networks from bilateral exposures and balance sheet data. The final session will be addressed to contagion channels in financial networks: default cascades, liquidity contagion, and asset fire sales, and the quantification of systemic risk in banking networks.
- Hoping you have a pleasant stay in Mexico City, I encourage you to become active players of the Course. Thank you for your attention.

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