

ABSTRACTS

CURSILLO

Daniel Hernández

CIMAT México

Tasas de Interés y Riesgo de Crédito para Modelos de Difusión Afines.

En este curso se darán los elementos esenciales de la modelación de tasas de interés, incluyendo la descripción de los principales instrumentos dentro del mercado de bonos. Especial énfasis será puesto en la valuación de estos instrumentos y su relación con contratos futuros, swaps, colateralizados, etc. Por otra parte, la modelación del riesgo de crédito es un componente esencial para el manejo de riesgo dentro del mercado financiero, por lo que usando el método de intensidad de Cox se extenderá la valuación a derivados de crédito y bonos corporativos.

CHARLAS

Adriana Abrego

UNIANDES

Retos en el Diseño de Coberturas Indexadas de Clima para Agricultura

Las Finanzas del Clima y para el Desarrollo juegan un papel fundamental para brindar resiliencia económica a las cadenas productivas primarias, como es el caso al sector de la agricultura. En esta charla, abordaremos algunos de los retos en el diseño metodológico y técnico de las coberturas climáticas indexadas para el sector de la agricultura; problemas que enfrentamos usualmente en países latinoamericanos. Comentaremos algunos métodos que se usan en la actualidad para el diseño de coberturas indexadas, así como ciertas soluciones que se han venido adecuando para superar los retos que comentaremos en la charla.

Alejandra Sánchez

UNAL Bogota

Modelamiento de tasas de interés con procesos Markov-modulados con saltos Pendiente*

Camilo Hernández

PRINCETON

Propagation of chaos for Schrödinger problems with interacting particles

The mean field Schrödinger problem (MFSP) is the problem of finding the most likely path of a McKean-Vlasov type particle with constrained initial and final configurations. It was first introduced by Backhoff et al. (2020), who studied its existence and long-time behavior. This talk aims to show how ideas from propagation of chaos for backward particle systems allow us to derive the MFSP as the (large population) limit of a sequence of classical Schrödinger problems among finite (but interacting) particles. The method rests upon the study of suitably penalized problems using stochastic control techniques, and it further allows us to derive other interesting results on the MFSP. This talk is based on a joint work with Ludovic Tangpi.

Carlos Castro

UROSARIO

Network Topology in Decentralized Finance

The composability and anonymity of participants in Decentralized Finance pose significant challenges in understanding their interactions and the buildup of risk within the network. We map the interconnections among decentralized finance protocols using transactions among contracts and addresses, explore single-layer and multiplex network properties, and quantify the financial exposure of the most critical nodes. We observe scale-free properties similar to traditional financial networks, but the inclusion of user interactions and the influence of externally owned accounts yield distinct network characteristics. Furthermore, centrality measures and high-frequency metrics provide insights into systemically important participants and at-risk protocols, necessitating further research to develop robust risk measures. The interaction between these measures and protocol failures are able to explain the significant reduction in transactions among participants for most of 2022. By identifying potential vulnerabilities and developing appropriate risk management strategies, the stakeholders can help ensure the stability and safety of decentralized finance as a viable alternative to traditional financial systems.

Diego Agudelo

EAFIT

Non-parametric identification of factors for the cross-section of Latin-American stock returns

Factor Investing is a globally recognized investment approach; however, its presence within the Latin American stock markets remains relatively limited. We use the Group Adaptive Elastic Net in a non-parametric framework to analyze Latin American stock returns from 2000 to 2020, initially considering 32 commonly employed financial factors. Our results show that a set of six factors significantly captures the majority of cross-sectional variance, particularly upon the incorporation of dynamic and non-linear effects. Furthermore, an active Factor Investing strategy based on these findings significantly outperforms a benchmark in an out-of-sample test.

Diego Amaya

Wilfrid Laurier University

Price Discovery in Option Panels: Evidence from S&P 500 Index Options

How informed investors trade in the option markets? Using a novel approach to measure the daily contribution of an individual option contract to price discovery, we study how informed investors trade across different contract types, moneyness levels, and maturities. Our analysis of the options on the S&P 500 index shows that on average informed traders prefer put, short-term, and at-the-money options. However, their preferences are subject to change depending on the level of market risk and the occurrence of return and volatility shocks. In addition, we observe significant shifts in the relevance of certain contract types for price discovery between 2004 and 2018. Specifically, a considerable increase in the importance of put, short-term, and out-of-the-money options for price discovery. This change aligns with the growing popularity and significance of weekly options, which we demonstrate are frequently employed by informed traders.

Diego Fonseca

Uniandes

Distributionally Robust Portfolio Optimization using Wasserstein Distances

This talk delves into the intricacies of portfolio optimization, treating it as a stochastic optimization program and analyzing it through the lens of distributionally robust optimization with a specific emphasis on Wasserstein distances. Central to the distributionally robust approach is the "ambiguity set." This set can be viewed in two distinct ways: one where it remains independent of the decision variable and another where it is dependent. Our primary goal is to assess these two interpretations within the portfolio optimization framework, weighing both their performance and tractability. We specifically zero in on two problems within this domain. The first is the mean-risk problem, where the aim is to minimize an objective function composed of expected losses plus the Conditional Value at Risk (CVaR) of these losses, the latter being scaled by a regularization parameter. The second problem targets minimizing the CVaR of losses, but under the condition that expected losses do not surpass a threshold defined by the investor. Here, the portfolio serves as the decision variable. A distinguishing factor between these two problems is the presence of stochastic constraints in the second, a feature absent in the first.

Diego Jara

Uniandes/QUANTIL

Optimización del Portafolio de Deuda de Naciones

La aplicación de la teoría de portafolios suele traer retos en el momento de implementarla a situaciones prácticas. La deuda de una Nación debe respetar una estructura que sea afín con su estrategia de mediano plazo y que busque maximizar el beneficio social mediante la optimización del perfil que permite la variedad de plazos, tasas y monedas. No obstante, elementos tales como la posibilidad de absorción de deuda por parte del mercado en cualquier situación o la necesidad de financiamiento presentan incertidumbres que deben ser consideradas al buscar el portafolio óptimo. Esta charla muestra los pasos seguidos en una aplicación real de recomendación del perfil de deuda de una Nación

Erick Treviño

UNAM México

A Doob-Meyer decomposition under model ambiguity: the case of compactness

We consider families of equivalent probability measures Q with a property related to concepts known in the literature under different names such as rectangularity or multiplicative stability. For the problems considered in this paper such a property yields dynamical consistency. We prove under a weak-compactness assumption with general filtrations and continuous processes that all semimartingales have an additive decomposition as the sum of a predictable non-decreasing process and a universal local supermartingale, by this concept we mean a process that is a local supermartingale with respect to each element of Q . We also show that processes having a supermartingale property with respect to a superadditive nonlinear conditional expectation associated to the family Q are always semimartingales under weak-compactness. These results are relevant in stochastic optimization problems including optimal stopping under model ambiguity.

Jaime Londoño
UNAL Manizales

Duesenberry Equilibrium with short-time optimization

We study inter-temporal equilibrium assuming an optimization criterion for short times based on the relative income approach for the solution of optimal consumption and investment for agents. We present an approach to handle many (including infinite) live agents and time-varying heterogeneous preferences of iso-elastic type. First, we present a result for optimal consumption and investment extending JA. Londoño. Duesenberry equilibrium and heterogeneous agents. (SIAM Journal on Financial Mathematics, 11(3):659–689, 2020) to infinitely many agents. Next, we propose a limiting behavior for infinitely many consumers that uses the latter behavior for consumption and investment in short times. We assume that agents often reset their consumption to reflect changes in their preferences for future consumption. We define a short-time Duesenberry inter-temporal Equilibrium as a market with the classical clearing conditions where the consumption and investment of agents are the results of the latter limiting optimal behavior for consumption and investment. We establish the characterization and existence of a short-time Duesenberry Equilibrium under a weak condition and develop an example that illustrates the features of the paper. Our model explains the "equity premium puzzle" and the "risk-free rate puzzle" reasonably well. The theoretical framework used is a generalization of markets when the processes are Brownian Flows on Manifolds.

Jose Luis Perez
CIMAT México

Bandidos de Lévy bajo tiempos de decisión Poissonianos

Consideraremos una versión a tiempo continuo del problema de bandidos multi-armados cuando las oportunidades de decisión ocurren en los tiempos de arribo de un proceso de Poisson, y discutiremos la optimalidad de la política basada en el índice de Gittins. Cuando el problema es conducido por un proceso de Lévy, mostraremos que el índice de Gittins puede ser expresado en términos de una factorización de Weiner-Hopf del proceso de Lévy observado en los tiempos de arribo de un proceso de Poisson independiente.

Julián Sanchez
URosario/Externado

Optimal liquidation with temporary and permanent price impact: evidence from the

This paper studies a real life application of the optimal liquidation of stocks in the presence of temporary and permanent price impacts. Using data from the order book of the BNB cryptocurrency, we estimate the functional form of the temporary and permanent price impact in three different scenarios: underestimation, overestimation and average estimation, finding different functional forms for each scenario. Using finite differences and optimal policy iteration, we solve the problem numerically and observe interesting changes in the optimal liquidation policy when applying calibrated linear and power forms for the temporary and permanent price impacts. Then, with these optimal policies, we identify optimal liquidation trajectories and simulate the liquidation of initial inventories to compare the performance among the optimal strategies under different parametrizations and against a naive strategy. Finally, we characterize the optimal policies based on a proposed functional form for the inventory and find that policies generating the highest revenue are those starting with a low trading rate and increasing with time.