INTERNATIONAL WORKSHOP ON
ECONOMIC GROWTH AND MACROECONOMIC DYNAMICS

Rome, September 15 and 16, 2022

Program
Abstracts

International Workshop on

Economic Growth and Macroeconomic Dynamics

Rome, 15-16 September 2022

Facoltà di Economia - Via del Castro Laurenziano 9, 00161 -Rome

(All hours are Rome time).

PROGRAM

Day 1: Sept 15, 2022

09:00-9:15

Registration

09:15-10:30

Room: Sala delle Lauree (1st Floor)
Zoom Link: https://uniroma1.zoom.us/j/82806548002

Welcome address

Carmelo Parello, Sapienza University of Rome

Eleonora Cavallaro, Sapienza University or Rome

Keynote lecture I

Economic effects of automation and their policy challenges

Klaus Prettner, University of Vienna

10:30-11:00

Coffee break

DIPARTIMENTO
DI ECONOMIA E DIRITTO

SAPIENZA
UNIVERSITÀ DI ROMA

INFER
INTERNATIONAL NETWORK FOR
ECONOMIC RESEARCH

11:00-13:00

Plenary session I

Room: Sala delle Lauree (1st Floor)
Zoom Link: https://uniroma1.zoom.us/j/82806548002

Chair: Prof. Pietro Peretto

- Soft Skills, Parenting Styles, and Persistent Income Inequality (**Mark Gradstein**)

- Endogenous growth, heterogeneous firms and workers: a framework for policy evaluation (Benedetti-Fasil, **Giammario Impullitti**, Omar Licandro, Petr Sedlacek, Adam Spencer)

- The Dynamics of Pareto Distributed Wealth in a Small Open Economy (Matthias Birkner, Niklas Scheuer, **Klaus Wälde**)

13:00 – 14:30

Lunch (buffet)

14:30- 16:30

Parallel sessions

Each session has 120 minutes and 4 papers; total time per paper will be 30 mns; up to 25 mns for presentation and 5mns for floor comments.

1.A - Automation, Robotization, and AI

Room: Laboratorio Informatico (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2493799904

Chair: Prof. Klaus Prettner

- Artificial Intelligence and its Effect on Competition and Factor Income Shares in Industrial Production (**Richard von Maydell**)
- Articial Intelligence as Self-Learning Capital (Hans Gersbach, Evgenij Komarov, **Richard von Maydell**)
- Data Production and the coevolving AI trajectories: An attempted evolutionary model (**Andrea Borsato,** Andre Lorentz)
- Automation and Inequality - The Role of Educational Spending (**Daniele Angelini,** Stefan Niemann, Florian Röser)

1.B - Fiscal Policy, Monetary Policy, and Growth

Room: Aula 1.D (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/8137062552

Chair: Prof. Carmelo Parello

- Fiscal Policy and Public Debt Anchor in A Behavioural Macroeconomic Model (Amélie Barbier-Gauchard, Thierry Betti, **Théo Metz**
- Debt Surges and Growth (**João Tovar Jalles,** Paulo Medas)
- Public Policies and Long-Run Growth in a Model with Environmental Degradation (**Luigi Bonatti,** Lorenza Alexandra Lorenzetti)
- Endogenous Growth and Monetary Policy: How Do Interest-Rate Feedback Rules Shape Nominal and Real Transitional Dynamics? (**Pedro Mazeda Gil,** Gustavo Iglésias, Luís Guimarães)

1.C - Innovation, Firms' Heterogeneity, and Growth

Room: Aula Marrama (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2955883721

Chair: Prof. Paolo Giordani

- Uncertainty, Openness to Novelty, and Economic Growth (**Maren Bartels**, Johannes Binswanger, Manuel Oechslin)
- Uneven Firm Growth in a Globalized World (**Xiaomei Sui**)
- Turbulent Growth: Business Dynamism and Aggregate Productivity (**Filippo Massari**)
- Firm Heterogeneity, Industry Dynamics and Climate Policy (**Ara Jo**, Christos Karydas)

1.D - Miscellaneous

Room: Aula Steve (5th Floor)

Zoom Link: https://uniroma1.zoom.us/j/5769273881

Chair: Prof Xavier Raurich

- Self-control preferences and the behavior of the saving rate (Jaime Alonso-Carrera, **Stéphane Bouché**)
- A Structural Ranking of Economic Complexity (**Ulrich Schetter**)
- Dynamic Tax Evasion and Capital Misallocation in General Equilibrium (Francesco Menoncin, **Andrea Modena**, Luca Regis)
- Technological Disruptions and Cybernetics: An Occupational Singularity Theory (**Pedro Albuquerque**, Sophie Albuquerque)

20:00-22:30

Social dinner

Casa dell'Aviatore

Viale Università, 20 - Rome

Tel: +39 06 4927161

Day 2: Sept 16, 2022

09:15-9:30

Presentation of the INFER network
Prof. Florina-Cristina Badarau, Vice-Chair of INFER

09:30-10:30

Keynote lecture II

<div align="center">

Room: Sala delle Lauree (1st Floor)

Zoom Link: https://uniroma1.zoom.us/j/82806548002

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The Emergence of the Managerial Class: A Tale of Technology and Market Size

Pietro Peretto, Duke University

10:30-11:00

Coffee break

11:00-13:00

Plenary session II

<div align="center">

Room: Sala delle Lauree (1st Floor)

Zoom Link: https://uniroma1.zoom.us/j/82806548002

</div>

Chair: Prof. Klaus Wälde

- Medium term endogenous fluctuations in three-sector optimal growth models (Kazuo Nishimura, Florian Pelgrin, **Alain Venditti**)

- Business Tax Reforms, Management Delegation, and Growth (**Maurizio Iacopetta**, Pietro Peretto)

13:00 – 14:30

Lunch (buffet)

14:30- 16:30

Parallel sessions

Each session has 120 minutes and 4 papers; total time per paper will be 30 mns; up to 25 mns for presentation and 5mns for floor comments.

2.A - Spatial Economics and Structural Change

Room: Aula 1.D (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/8137062552

Chair: Prof. Antonio Minniti

- Decomposing Structural Change (**Jaime Alonso-Carrera**, María Jesús Freire-Serén, Xavier Raurich)

- Structural Change, Land Use and Urban Expansion (Nicolas Coeurdacier, Florian Oswald, **Marc Teignier)**

- Agricultural Composition and Labor Productivity (Cesar Blanco, **Xavier Raurich)**

- Public Infrastructure Spatial Complementarities in the Brazilian Structural Transformation (Fidel Pérez-Sebastián, **Rafael Serrano-Quintero**, Jevgenijs Steinbuks)

2.B - Inequality and Growth

Room: Laboratorio informatico (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2493799904)

Chair: Prof. Francesco Venturini

- Spatial Inequality, Poverty and Informality in the Democratic Republic of the Congo (Douglas Amuli Ibalea, Frédéric Docquierb and **Zainab Iftikharc**)

- Inequality and poverty in the European Union: In search of lost dynamics (**Celia Gil-Bermejo Lazo**, Jorge Onrubia Fernández, Jesús Sánchez-Fuentes)

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- A Tale of Two Cities: Communication, Innovation, and Divergence (Stefano Magrini, **Alessandro Spiganti**)

2.C - Demographics and Growth

Room: Aula Steve (5th Floor)

Zoom Link: https://uniroma1.zoom.us/j/5769273881

Chair: Prof. Fabio Mariani

- Infectious disease and endogenous cycles: lockdown hits two birds with one stone (David Desmarchelier, Magali Jaoul-Grammare, **Guillaume Morel**, Thi Kim Cuong Pham)

- Population density, capital formation and economic development (**José Pedro Pontes**)

- Untimely Destruction: Pestilence, War and Accumulation in the Long Run (Clive Bell, Hans Gersbach, **Evgenij Komarov**)

- Estimating the Growth Effect of the Demographic Dividend (**Balazs Zélity**)

2.D - Macroeconomic Dynamics

Room: Aula Marrama (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2955883721

Chair: Prof. Eleonora Cavallaro

- Sentiment, productivity, and economic growth (George Constantinides, Maurizio Montone, **Valerio Potì**, Stella Spilioti)

- A Theoretical Foundation for Prudential Authorities Decision Making (**Cristina Badarau**, Corentin Roussel)

- Misperception of credit risk and macroprudential policy (Alexandra Campmas**, Corentin Roussel**, Ibrahima Sangar)

- Bank credit and economic growth: a dynamic threshold panel model for ASEAN countries (Sy-Hoa Ho, **Jamel Saadaoui**)

ABSTRACTS

Plenary session I

Mark Gradstein

Soft Skills, Parenting Styles, and Persistent Income Inequality

The proposed hereby theory accounts for the persistence of income inequality by incorporating in the process of human capital formation, the main engine of growth, soft skills, instilled in children by their parents. The mental cost associated with this process affects - and is affected by – income growth, implying a bidirectional relationship that leads to a propagation mechanism. Consequently, the model economy displays multiple steady states, convergence to which depends on the initial distribution of soft skills. An extension of the model to encompass parenting styles is presented and its relation to persistent income inequality explored.

Benedetti-Fasil, Giammario Impullitti, Omar Licandro, Petr Sedlacek, Adam Spencer

Endogenous growth, heterogeneous firms and workers: a framework for policy evaluation

This paper builds a model of endogenous growth and business cycle to analyse the impact of a wide set of innovation policies on growth and income distribution. There are several dimensions of heterogeneity. Firms differ in productivity and in innovation ability, thereby having a different growth potential. Workers differ in their ability to acquire skills via education. Innovation requires a higher level of skills than production, hence innovation policies affect both income growth and its distribution across different workers. The framework is used to analyse the impact of key policies to stimulate growth, such as, innovation grants, loans, tax credits, and education subsidies. The focus is on the policy impact on both growth and income inequality, thereby providing a toolbox to search for policy mixes to pursue shared prosperity. The analysis highlights the role of _rm and workers heterogeneity in shaping the growth and distributional effect of policy. Both horizontal policies, treating all firms equally, and selective policies are considered.

Matthias Birkner, Niklas Scheuer, Klaus Wälde

The Dynamics of Pareto Distributed Wealth in a Small Open Economy

We study a small open economy displaying Pareto-distributed wealth resulting from random death. The government runs a distribution scheme on inheritance. We present the mathematical background that allows to study the dynamics of means. We end up with ordinary differential equations for the mean of age and of individual and government wealth. We also study distributional dynamics analytically. Starting from any distribution of age and wealth, the aggregate distribution converges, both on a transition path towards a steady state and on a transition path towards balanced growth, to an exponential distribution of age and a Pareto distribution of wealth. The findings are illustrated for different distribution schemes.

Parallel sessions

1.A - Automation, Robotization, and AI

Richard von Maydell

Artificial Intelligence and its Effect on Competition and Factor Income Shares in Industrial Production

We examine the effect of Artificial Intelligence (AI) and its capacity of selflearning—it improves by being applied, tested and trained—on market competition in industrial production. For the incorporation of AI in production, firms have to pay variable costs for software acquisition and fixed costs to build up AI infrastructure. Fixed costs may constitute a market barrier for firms with a low AI productivity and we assess their effects on markups, competition and factor income shares. Furthermore, we discuss policies that impede AI-induced monopolies in industrial production, income divergence between heterogeneously-skilled agents and enhance the growth rate of AI.

Hans Gersbach, Evgenij Komarov, Richard von Maydell

Articial Intelligence as Self-Learning Capital

We model Artificial Intelligence (AI) as self-learning capital: Its productivity rises by its use. In our model, an AI sector and an applied research (AR) sector produce intermediates for a final good firm and compete for high-skilled workers| while benefiting from mutual spillovers. The economy displays a sequence of four tipping points: First, entrepreneurs and second, high-skilled workers drive the accumulation of self-learning AI. This is reversed in two subsequent tipping points. In the steady state, AI accumulates autonomously due to spillovers from AR and we show that suitable tax policies induce socially optimal movements of workers.

Andrea Borsato, Andre Lorentz

Data Production and the coevolving AI trajectories: An attempted evolutionary model

This paper contributes to the understanding of the relationship between the nature of data and the Artificial Intelligence (AI) technological trajectories. We develop an agentbased model in which firms are data producers that compete on the markets for data and AI. The model is enriched by a public sector that fuels the purchase of data and trains the scientists that will populate firms as workforce. Through several simulation experiments we analyze the determinants of each market structure, the corresponding relationships with innovation attainments, the pattern followed by labour and data productivity, and the quality of data traded in the economy. More precisely, we question the established view in the literature on industrial organization according to which technological imperatives are enough to experience divergent industrial dynamics on both the markets for data and AI blueprints. Although technical change behooves if any industry pattern is to emerge, the actual unfolding is not the outcome of a specific technological trajectory, but the result of the interplay between technology-related factors and the availability of data-complementary inputs such as labour and AI capital, the market size, preferences and public policies.

Daniele Angelini, Stefan Niemann, Florian Röser

Automation and Inequality - The Role of Educational Spending

We analyze the role of educational spending on growth and inequality in a dynamic R&D growth model with endogenous education and automation. We assume low-skilled workers to be perfect substitutes for machines, while high-skilled workers are complements. Automation increases income inequality and the share of college graduates over time. Without government spending on education, an increase in taxes to reduce inequality always dampens growth. Educational spending can break this equality-growth trade-off. Public educational spending increases the productivity of both low- and high-skilled workers allowing for redistribution towards the low-skilled which reduces inequality. We calibrate the model using US data and provide the conditions on basic and higher education spending, and on transfers, such that higher growth is compatible with lower inequality. We show that such a result can be achieved by increasing basic education spending at the expense of higher education, or, given the government can target transfers, through a combination of different policies altering the tax structure and the spending allocation.

1.B - Fiscal Policy, Monetary Policy, and Growth

Room: Aula 1.D (6ᵗʰ Floor)

Zoom Link: https://uniroma1.zoom.us/j/8137062552

Amélie Barbier-Gauchard, Thierry Betti, Théo Metz

Fiscal Policy and Public Debt Anchor in A Behavioural Macroeconomic Model

We develop a behavioral macroeconomic model to renew the analysis of fiscal policy with independent fiscal institutions (IFIs) and especially state-dependent fiscal multipliers. Indeed, this model is able to produce waves of optimism and pessimism along the business cycles. More specifically, we document how confidence of agents about public debt targeting influences the volatility of the economy and the fiscal multiplier. To do so, we model heterogenous expectations' process with fundamentalists and chartists, agents having the ability to switch from one rule to another in function of effective outcome at each period. We consider that the confidence of agents about public debt targeting is measured by the share of fundamentalists at each period. Main results show that the credibility of the independent fiscal institution plays a crucial role to build a reliable debt target and could help to stabilize more the economy after a shock in terms of debt volatility, amplitude of government spending multiplier, the period numbers of compliance with the debt target and finally the length of these latter. This article asks the question of the role of independent fiscal institutions to increase credibility and transparency of active fiscal policies and public debt targeting. Such an institution could help governments to be more credible in terms of debt targeting with, as a result, a more stable economy and a more effective fiscal policy.

João Tovar Jalles, Paulo Medas

Debt Surges and Growth

Debt levels, both private and public, were already at record highs before the Covid-19 pandemic, and surged further in 2020. The high indebteness raises concerns whether it will undermine future growth prospects. This paper contributes to the ongoing debate by examining the effect of debt surges on real and potential GDP. We apply a local projection method to a new dataset of debt surges in 190 countries between 1970 and 2020. Debt surges tend to be followed by weaker economic growth and output remains lower over the medium term. However, this negative relationship does not always hold as it depends on the type of debt surge and the initial conditions. Surges in public debt tend to have the most negative impact on future growth prospects. This is particularly the case if the economy is operating with a large positive output gap. Debt surges also tend to be

followed by weaker economic growth if the initial debt levels are high, especially for private debt surges. Interestingly, debt surges are not less detrimental to growth when the initial interest rates are low.

Luigi Bonatti, Lorenza Alexandra Lorenzetti

Public Policies and Long-Run Growth in a Model with Environmental Degradation

We study how public policies affects an economy where production emits pollutants and investment in productive assets raises the economy's overall productivity. We explore two hypotheses about how the accumulation of pollutants affects human well-being. Under the first one, there is no limit to the possibility for households to defend themselves against environmental degradation by increasing the use of manmade artifacts, while under the second one there is a threshold beyond which the effects of the accumulation of pollutants cannot be offset by devoting more output to this scope. Under both hypotheses, we compare the laissez-faire (LF) to the socially optimal (SO) path. Then, we check whether the latter can be decentralized by using the policy instruments available to the government. Under the first hypothesis, GDP and pollutants grow slower along the SO balanced growth path (BGP) than along the LF BGP, while people's well-being is greater along the former. Therefore, green policies driving the economy along its OP tend to reduce GDP growth. Under the second hypothesis, LF may lead to a "climate catastrophe" by determining unbounded growth, which−without incentives to invest in green technology−drives the amount of pollutants beyond its maximum compatible with life on earth.

Pedro Mazeda Gil, Gustavo Iglésias, Luís Guimarães

Endogenous Growth and Monetary Policy: How Do Interest-Rate Feedback Rules Shape Nominal and Real Transitional Dynamics?

Monetary authorities have followed interest-rate feedback rules in apparently different ways over time and across countries, with the literature distinguishing, in particular, between active and passive monetary policies. We address the nominal and real transitional-dynamics implications of these different types of monetary policy, in the context of a monetary growth model of R&D and physical capital accumulation. In this setup, well-behaved saddlepath transitional dynamics occurs under both active and sufficiently passive monetary policies. We carry out our study from three perspectives: the convergence behaviour of catching-up economies; a structural one-off shift in monetary policy (i.e., a change in the long-run inflation target); and a one-off shift in real industrial policy (i.e., an R&D or a manufacturing subsidy). We uncover a new channel through which institutional factors (the characteristics of the monetary-policy rule) influence the economies' convergence behaviour and through which monetary authorities may leverage (transitional) growth triggered by structural shifts.

1.C - Innovation, Firms' Heterogeneity, and Growth

Room: Aula Marrama (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2955883721

Maren Bartels, Johannes Binswanger, Manuel Oechslin

Uncertainty, Openness to Novelty, and Economic Growth

Successful innovations are a key driver of long-run economic growth. In practice, potential innovations come with a great deal of uncertainty, i.e., a dearth of objective information on the likelihood of eventual success or failure. We present a tractable growth model in which entrepreneurs are characterized by their openness to novelty. Greater openness makes it more likely that, against the backdrop of uncertainty, potential innovations

are checked out; but greater openness can also lead to exuberance, to negative signs being ignored and then to misallocation and crisis-induced paralysis. We analyze this trade-off_and show that it implies a hump-shaped relationship between openness and long-run growth. The calibrated model predicts that over a significant part of the range the negative effect of openness dominates, a result we show to be consistent with the empirical pattern. On the other hand, the calibrated model suggests that heterogeneity in entrepreneurial openness to novelty helps growth. The magnitude of the effect is sizable.

Xiaomei Sui

Uneven Firm Growth in a Globalized World

I provide a new set of empirical facts and a novel model that globalization triggers a stronger investment response of leader firms relative to follower firms, thereby increasing industrial concentration and lower long-run aggregate productivity growth in advanced OECD countries. Empirically, I document a comprehensive picture of the divergence in sales, productivity, and intangibles between leaders and followers in advanced OECD countries. Strikingly, sales divergence is more significant in the foreign market than the domestic market. Moreover, industries with a larger increase in export intensity have a larger divergence in sales, productivity, and intangibles. To explain these facts, I develop a novel two-country endogenous growth model with strategic domestic and international competition where firms make productivity-enhancing investments strategically to increase sales in the domestic and foreign markets. Globalization, modeled as increasing international knowledge spillovers and decreasing trade iceberg costs, generates larger foreign market size and triggers a stronger investment response of leaders relative to followers. The induced increase in industrial concentration among domestic firms eventually depresses firms' investment incentives and productivity growth via the "weaker domestic competition". Productivity
growth is also negatively affected by the "harsher international competition". The model finds that globalization accounts for almost 100% of the rise in industrial concentration and 67% of the productivity growth slowdown in the data. The increasing international knowledge spillover force of globalization dominates. The analysis suggests that globalization-induced weaker domestic competition is more harmful than harsher international competition on aggregate productivity growth.

Filippo Massari

Turbulent Growth: Business Dynamism and Aggregate Productivity

This paper formulates a model of turbulent endogenous growth. Turbulence denotes the endogenous job reallocation due to entry, exit, and churning (movements within the firm-size distribution). The insight central to the model is that the forces that drive aggregate growth also drive turbulence because the two are manifestations of a single underlying process: competition for market share. The profit motive drives competition for market share through R&D. When firms expand their market share they face a lower relative price, reducing the marginal value of further gains in market share. This leads to the emergence of diminishing returns in relative terms. Therefore, incentives to innovate decline in relative size, generating churning endogenously as mean-reversion. This mechanism delivers a stationary, non-degenerate firm-size distribution with a realistic right tail dependent on R&D. Meanwhile, constant returns to the cumulative factor (knowledge) drive a sustained aggregate growth rate determined by R&D. Endogenous entry and exit entail selection effects that shape the characteristics of the firm population, and generate a firm life cycle, affecting R&D, thus growth. In a quantitative application that replicates changes in turbulence in the US, I find that aggregate productivity growth declines mildly despite higher R&D effort.

Ara Jo, Christos Karydas

Firm Heterogeneity, Industry Dynamics and Climate Policy

Climate policy may induce firms with limited capacity to substitute clean for dirty inputs to exit the market. We investigate and quantify this channel in a dynamic general equilibrium model with heterogeneous firms and endogenous entry and exit. The model incorporates empirical observations that firms differ substantially in their capacity to substitute clean for dirty inputs in their production process and the average economy-wide fuel substitution capacity has been evolving along with the stringency of climate policy. Our model highlights the effect of dynamic industry response on increasing the average elasticity of substitution in the economy due to the exit of least flexible firms in response to climate policy. The higher average elasticity of substitution increases the effectiveness of the policy at reducing emissions, resulting in a 35 percent decrease in the size of the carbon tax required to achieve carbon neutrality in the new long
run equilibrium. We also explore implications of different policy instruments in the presence of endogenous industry dynamics.

1.D - Miscellaneous

Room: Aula Steve (5th Floor)

Zoom Link: https://uniroma1.zoom.us/j/5769273881

Jaime Alonso-Carrera, Stéphane Bouché

Self-control preferences and the behavior of the saving rate

We characterize the dynamics of the saving rate in a growth model where consumers exhibit present-biased preferences. Based on empirical evidence, we assume that consumers are subject to temptation and exhibit a preference for costly self-control. Moreover, we propose the intensity of these phenomena to depend on aggregate wealth. We show that in economies where consumers are present-biased, the saving rate follows a hump-shaped pattern after an exogenous destruction of the initial capital stock. The present bias effect on the intertemporal consumption choice counteracts the standard effect from decreasing returns to capital. After a large destruction of capital, the temptation effect can dominate in the first periods of the adjustment process. By calibrating the model, we obtain a very good fit between our simulations and data concerning the saving rate, the growth rate and the speed of convergence from the European recovery after World War II. The accuracy of the fit is substantially larger when the intensity of temptation is endogenous.

Ulrich Schetter

A Structural Ranking of Economic Complexity

We propose a structural alternative to the Economic Complexity Index (ECI, Hidalgo and Hausmann 2009; Hausmann et al. 2011) that ranks countries by their complexity. This ranking is tied to comparative advantages. Hence, it reveals information different from GDP per capita on the deep underlying economic capabilities of countries. Our analysis proceeds in three main steps: (i) We first consider a simplified trade model that is centered on the assumption that countries' global exports are logsupermodular (Costinot, 2009a), and show that a variant of the ECI correctly ranks countries (and products) by their complexity. This model provides a general theoretical framework for ranking nodes of a weighted (bipartite) graph according to some underlying unobservable characteristic. (ii) We then embed a structure of log-supermodular productivities into a multi-product Eaton and Kortum (2002)-model, and show how our main insights from the simplified trade model apply to this richer set-up. (iii) We finally implement our structural ranking of economic complexity. The derived ranking is robust and remarkably similar to the one based on the original ECI.

Francesco Menoncin, Andrea Modena, Luca Regis

Dynamic Tax Evasion and Capital Misallocation in General Equilibrium

We study tax evasion in a tractable macroeconomic model with productive public expenditure financed by a fixed-rate income tax. Taxpayers are heterogeneous in their productivity and subject to borrowing constraints. They can lower their fiscal burden by evading taxes at the risk of being audited (and fined) by the government. We solve the model for its competitive equilibrium and characterize entrepreneurs' optimal policies contingent on their individual productivity and the endogenous price levels. The model predicts that enforcing tax compliance stimulates the productivity of public expenditure, thus making less productive enterprises viable. At the same time, however, fewer evasion opportunities alleviate borrowing constraints by offsetting the advantage of low-productivity (and highly-evasive) entrepreneurs, thereby re-allocating capital to more productive users. On the demand side, decreasing tax evasion reduces consumption levels by curbing private capital accumulation. However, it fosters consumption rates by mitigating entrepreneurs' precautionary motif against auditing risk.

Pedro Albuquerque, Sophie Albuquerque

Technological Disruptions and Cybernetics: An Occupational Singularity Theory

We present an occupational singularity theory of technological disruption with the help of complexity theory, cybernetics science and occupational science. To support the theory, we build a phase transition, overlapping generations, Solow-inspired growth model with economic sectors and labor skill sets of a legacy and a cybernetics nature. We propose that disruptive socioeconomic effects of skill-replacing technology innovations are determined neither by human characteristics, such as "low skills" or "low cognition," nor by task characteristics, such as "routine," but by the cybernetic characteristics of the innovations. This allows us to decompose skill-replacing technology innovations into weakly and strongly superhuman components. The theory produces a phase transition, that is, an occupational singularity. Our theory is supported by United States data, and explains socioeconomic stylized facts and puzzles such as: the rise of cyber-entrepreneurs, the declining number of hours at work, the instability of the skill premium, the rising income inequality, the declining labor share of income, the productivity paradox, secular stagnation, and Piketty's fundamental inequality observations.

Plenary session II

Room: Sala delle Lauree (1ˢᵗ Floor)

Zoom Link: https://uniroma1.zoom.us/j/82806548002

Kazuo Nishimura, Florian Pelgrin, Alain Venditti

Medium term endogenous fluctuations in three-sector optimal growth models

Following the recent contribution of Beaudry et al. [8], this paper shows that a three-sector optimal growth model without frictions can provide new insights regarding the emergence of endogenous medium-term fluctuations. Notably, our 3-sector model highlights that matching the empirical evidence critically depends on agent's preferences and, in particular, the consumption of a bundle of (at least) two final goods. Endogenous fluctuations are then likely to occur through both relative differences of capital intensity between sectors and intertemporal consumption allocations based on substitution effects between the two final consumed goods. On top of thoroughly characterizing the economy dynamics and the existence of clear conditions relative to (Hopf) bifurcation values, we closely examine the theoretical periodicity of the corresponding limit cycles. Finally, using a calibration of the US economy, our model can reproduce the observed peak range of the spectral density around 8 to 10 years of the cyclical component of the gross domestic product, gross private

investment, personal consumption expenditures, and of the corresponding price deflator series. Furthermore, such limit cycles are generated under very plausible technological parameters and estimates of the elasticities of intertemporal substitution.

Maurizio Iacopetta, Pietro Peretto

Business Tax Reforms, Management Delegation, and Growth

We study the growth and welfare effects of a business tax cut in two economies that differ with respect to firms' governance. In one the founders of the firms delegate management; in the other they do not. Growth is driven by the arrival of new firms, and by the accumulation of intangibles. Delegation occurs if the country's rule of law is sufficiently strong. The user cost of capital captures agency costs in the delegation economy and the inefficiency of the owner-managers in the one without delegation. We calibrate the model to the US economy. We find that, in the short run, a profit income tax cut is from one-fifth to a half more pro-growth in the economy with delegation than in the one without. In the long run, however, in both economies per capita growth rate declines. A dividend tax cut generates negative short and long run growth effects in both types of economies.

Parallel sessions

2.A - Spatial Economics and Structural Change

Room: Aula 1.D (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/8137062552

Jaime Alonso-Carrera, María Jesús Freire-Serén, Xavier Raurich

Decomposing Structural Change

We identify the economic fundamentals governing the process of structural change in a non-parameterized growth model. These fundamentals are: the income elasticities of the consumption demand, the Allen-Uzawa elasticities of substitution between consumption goods, the capital income shares in sectoral outputs, the sectoral elasticities of substitution between capital and labor, and the degree of factor-bias in the technical change. These fundamentals determine the effect of aggregate income, relative prices, rental rates and technological progress on structural change. From this analysis, we derive an accounting method for measuring the relative importance of the structural change mechanisms in parameterized growth models. We show how it can be applied to some well-known parameterizations. Using a particular parameterization, we account for the contribution of each mechanism to the U.S. structural change in the period 1947-2010.

Nicolas Coeurdacier, Florian Oswald, Marc Teignier

Structural Change, Land Use and Urban Expansion

We develop a multi-sector spatial equilibrium model with endogenous land use: land is used either for agriculture or housing. Urban land, densely populated due to commuting frictions, expands out of agricultural land. With rising productivity, the reallocation of workers away from agriculture frees up land for cities to expand, limiting the increase in land values despite higher income and increasing urban population. Due to the reallocation of land use, the area of cities expands at a fast rate and urban density persistently declines, as in the data over a long period. As structural change slows down, cities sprawl less and land values start increasing at a faster rate, as in the last decades. Quantitative predictions of the joint evolution of density and land values across time and space are confronted with historical data assembled for France over 180 years.

Cesar Blanco, Xavier Raurich

Agricultural Composition and Labor Productivity

Labor productivity differences between developing and developed countries are much larger in agriculture than in non-agriculture. We show that differences in agricultural composition across countries explain a substantial part of these labor productivity differences. To this end, we group agricultural products into two sectors: capital-intensive and labor-intensive agriculture. As the economy develops and capital accumulates, the price of labor-intensive agricultural goods relative to capital-intensive agricultural goods increases. This price change drives a process of structural change that moves land and farmers to the capital-intensive sector, increasing labor productivity in agriculture. We illustrate this mechanism using a multisector growth model that generates transitional dynamics consistent with patterns of structural change observed in Brazil and differences in agricultural composition and labor productivity consistent with cross-country data.

Fidel Pérez-Sebastián, Rafael Serrano-Quintero, Jevgenijs Steinbuks

Public Infrastructure Spatial Complementarities in the Brazilian Structural Transformation

We ask how much of the spatial evolution of structural transformation can be attributed to electrification and transportation improvements. We model jointly the endogenous evolution of transport and electricity networks in a multi-sector quantitative economic geography model for the case of Brazil. In our model, the government chooses infrastructure investments to maximize welfare. One key aspect is that sectoral TFPs are determined partly by roads access and electricity quality. We estimate the sectoral TFPs elasticities with respect to population, quality of electricity, and quality of roads. We find these to be the largest in services. Agriculture and manufacturing benefit the most from quality of electricity. We assess the optimality of the quality of roads and electricity for Brazil and find that there are large gains from reshaping infrastructure. We also assess complementarities from jointly deciding roads and electricity investments. Our results suggest these complementarities are driving most of the welfare gains.

2.B - Inequality and Growth

Room: Laboratorio informatico (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2493799904)

Douglas Amuli Ibalea, Frédéric Docquierb and Zainab Iftikharc

Spatial Inequality, Poverty and Informality in the Democratic Republic of the Congo

We build a two-sector model with labor market frictions to explain income disparities between provinces, sectors (formal vs. informal), and skill groups (skilled vs. unskilled) in the Democratic Republic of the Congo. We then parameterize the model to match observed income and employment data. We conduct a set of counterfactual "policy" experiments, to analyze the role of technologies, human capital, infrastructure, and labor market frictions in explaining spatial and within-province inequalities. We highlight strong "O-ring" inequality patterns, implying that successful development policies involve a combination of coordinated policy actions. While spatial inequalities are mostly determined by technological disparities, a development policy that disregards the informal sector has anti-redistributive effects. Taken in isolation, policies targeting education, infrastructure, and labor market frictions can increase inequality and poverty, at least along the intensive margin.

Celia Gil-Bermejo Lazo, Jorge Onrubia Fernández, Jesús Sánchez-Fuentes

Inequality and poverty in the European Union: In search of lost dynamics

This paper analyses the relationships between income inequality, monetary poverty and economic growth for a sample of 30 European economies over the period 2004-2020. To do so, we adopt a novel approach, based on a dynamic analysis that takes into account the variability that can occur in the evolution of these relationships over the period analysed. The proposed panel-VAR model allows us to perform a Granger causality analysis between the variables mentioned. In a second stage, we complete this analysis with the application of the iterative PC algorithm that allows us to interpret the results of the model by defining the corresponding causal graphs. For the empirical analysis we use micro-data from the EU-SILC database for the period 2004-2020. The results obtained show that, for the set of economies analysed, inequality has a positive effect on poverty. Moreover, we also find that this dynamic is reversed, with a double positive causality between these variables. In addition, we do not find evidence of a poverty or inequality reducing effect of economic growth. However, we find that these results differ across countries, depending on the type of welfare state in place.

Stefano Magrini, Alessandro Spiganti

A Tale of Two Cities: Communication, Innovation, and Divergence

We present a two-area endogenous growth model where abstract knowledge flows at no cost across space but tacit knowledge arises from the interaction among researchers and is hampered by distance. Digital communication reduces this "cost of distance" and reinforces productive specialization, leading to an increase in the system-wide growth rate but at the cost of more inequality within and across areas. These results are consistent with evidences on the rise in the concentration of innovative activities, income inequality, and skills and income divergence across US urban areas.

2.C - Demographics and Growth

Room: Aula Steve (5th Floor)

Zoom Link: https://uniroma1.zoom.us/j/5769273881

David Desmarchelier, Magali Jaoul-Grammare, Guillaume Morel, Thi Kim Cuong Pham

Infectious disease and endogenous cycles: lockdown hits two birds with one stone

This paper develops a competitive Ramsey-Cass-Koopmans framework in which an infectious disease evolves according to a simple SIS model. It aims at examining how the lockdown a¤ects infectious disease persistence, individual welfare, and economic dynamics. In contrast to the existing literature, two types of infectives are introduced: (1) symptomatics and (2) asymptomatics. While the former is assumed to be too ill to work, the latter supply their labour and spread the disease. The government imposes a lockdown as an instrument to control the disease spread. In the long run, when the contamination rate of the disease is relatively high and the share of asymptomatics is low enough, the lockdown is welfare improving regardless of the degree of household empathy toward infectives. Moreover, a stable limit cycle can emerge near the endemic steady-state, through a Hopf bifurcation, when the share of infectives increases sufficiently the marginal utility of consumption. Particularly, we prove that it is possible to tune the lockdown to simultaneously obtain the limit cycle disappearance and the disease eradication (Bogdanov-Takens bifurcation). In this sense, the lockdown allows hitting two birds with one stone.

José Pedro Pontes

Population density, capital formation and economic development

We consider a spatial economy where an undifferentiated consumer good is produced by competitive agents along two successive growth regimes. Under the first growth regime (called "classical" or "Malthusian"), each agent self-produces the required (human) capital good and the elasticity of output per worker relative to employment density is negative. If population increases sufficiently, then final producers switch to outsourcing the (human) capital good to monopolistically competitive firms. Under this "modern" regime, the per capita income elasticity relative to density might become positive only if the role of land as a factor of final goods production is diminished.

Clive Bell, Hans Gersbach, Evgenij Komarov

Untimely Destruction: Pestilence, War and Accumulation in the Long Run

This paper analyses the effects of disease and war on the accumulation of human and physical capital. We employ an overlapping-generations framework in which young adults, confronted with such hazards and motivated by old-age provision and altruism, make decisions about investments in schooling and reproducible capital. A poverty trap exists for a wide range of stationary war losses and premature adult mortality. If parents are altruistic and the sub-utility function for their own consumption is more concave than that for their evaluation of their children's full income in adulthood, the only possible steady-state growth path involves full education. Otherwise, steady-state paths with incompletely educated children may exist; some are stationary. We also examine, analytically and with numerical examples, a growing economy's ability to withstand shocks in a stochastic environment. The initial boundary conditions and beliefs have a strong influence on the nature of the paths generated by a sequence of destructive shocks, even when limited in number. Calibrated to Kenya, whose AIDS epidemic has been especially severe, the associated simulations illustrate the main findings

Balazs Zélity

Estimating the Growth Effect of the Demographic Dividend

The "demographic dividend" refers to the economic growth boost countries receive during the demographic transition. The sources of the dividend are debated in the literature. Changing age structure leading to lower dependency ratios, and human capital accumulation brought about by higher investment into schooling are two of the leading candidates. This paper uses a rational expectations, general equilibrium model to quantify how much of a growth boost changing age structure can generate. Depending on the timing and pace of the demographic transition, the results suggest an annual growth boost of 0.1-0.5 percentage points is produced by changing age structure.

2.D - Macroeconomic Dynamics

Room: Aula Marrama (6th Floor)

Zoom Link: https://uniroma1.zoom.us/j/2955883721

George Constantinides, Maurizio Montone, Valerio Potì, Stella Spilioti

Sentiment, productivity, and economic growth

Previous research finds correlation between sentiment and economic growth, but disagrees on the mechanism that explains this result. In this paper, we shed new light on this issue by exploiting cross-country variation in

market efficiency. In G7 economies, we find that sentiment shocks increase capital investments but exhibit no relation with future productivity. In non-G7 countries, sentiment shocks are associated with higher investment, consumption, and employment, and followed by an increase in productivity. The results suggest that sentiment can indeed create economic booms but only in less advanced economies, where noisy asset prices make sentiment and fundamentals harder to disentangle.

Cristina Badarau, Corentin Roussel

A Theoretical Foundation for Prudential Authorities Decision Making

In the aftermath of the Global Financial Crisis, financial regulation uses micro- and macro-prudential rules, most of the time motivated by empirical studies. This article suggests a theoretical explanation for countercyclical and progressive capital requirements that incorporate micro- and macro-prudential stabilization objectives. The Capital Adequacy Ratio (CAR) imposed to individual banks by a Prudential Authority (PA) would thus represent an optimal regulation whose aim is to avoid individual and systemic risk accumulation by imposing minimal constraints to financial institutions. This corresponds to the implementation of optimal time-varying prudential capital requirements to banks, with non-linear structure, that allows PA to take progressive countercyclical actions in order to ensure financial stability. We also test the mechanism in a DSGE model and show that it would be more suitable for the financial and real stability compared to the existing fixed prudential ratios.

Alexandra Campmas, Corentin Roussel, Ibrahima Sangar

Misperception of credit risk and macroprudential policy

The 2008 Global Financial Crisis had shed light on the necessity to regulate risk behavior of banks. A large part of DSGE literature on macroprudential policies focus on their efficiency by considering that banks are not subject to misperception of credit risk during credit boom. This misperception (or overoptimistic view) of banks also influences the risk weight of their assets portfolio and can deteriorate their financial robustness during crisis. We try to fill this gap by building a DSGE model which incorporates default in mortgage and corporate loans with overoptimistic banks and macroprudential regulations such as Capital Requirement (CR) and Loan-to-Value (LTV). Our results are following: during credit boom, overoptimistic banks amplify upturn of credit cycle which incites firms to increase their production. However, to minimize cost of capital requirement constraint, overoptimistic banks change their strategy by decreasing their capital while amount of loans are still high. This behavior leads banks to be more fragile in case of crisis and justifies a stronger intervention like the one suggested by Basel III accords.

Sy-Hoa Ho, Jamel Saadaoui

Bank credit and economic growth: a dynamic threshold panel model for ASEAN countries

While it is widely recognized that the development of a sound financial system may contribute to foster economic growth, the relation between economic growth and financial activities is complex. In this perspective, our contribution investigates the existence of threshold effects in the relationship between economic growth and bank credit. Our sample of ASEAN countries is examined over the period spanning from 1993 to 2019. We use the approach of Kremer et al. (2013) to estimate hreshold effects in a dynamic panel where a group of explanatory variables can be endogenous. Our results confirm the vanishing effect of finance on economic growth. We found a threshold of 96.5% (significant at the 5% level) for the credit-to-GDP ratio, the threshold variable. In the short run, for observations inferior or equal to the threshold, the positive effect of bank credit expansion on economic growth is around 0.08 (significant at the 1% level). Whereas, for observations superior to the threshold, the positive effect of bank credit expansion on economic growth is

around 0.01, but not significant. The role of exporting firms is essential in ASEAN countries as they are more export-oriented than other regions in the world economy. Our results may indicate that the beneficiary of the credit (firms versus households), the structural features (export-led growth), and the regional heterogeneity have to be considered in empirical investigations of threshold effects in the relation between economic growth and bank credit. This empirical evidence may help to formulate sound policy recommendations.