Edited by
Attilio Trezzini

RESEARCH LINES OF THE DEPARTMENT OF ECONOMICS

2 Collana
Dipartimento di Economia

RomaTrE-Press
2021

Università degli Studi Roma Tre
Dipartimento di Economia

RESEARCH LINES OF THE DEPARTMENT OF ECONOMICS

Edited by
Attilio Trezzini

2 Collana
Dipartimento di Economia

RomaTrE-Press
2021

Dipartimento di Economia
COLLANA
n. 2, dicembre 2020
Research Lines of the Department of Economics

Coordinamento editoriale
Gruppo di lavoro *RomaTrE-Press*

Cura editoriale e impaginazione
teseo editore Roma teseoeditore.it

Elaborazione grafica della copertina
MOSQUITO mosquitoroma.it

Caratteri grafici utilizzati:
Minion Pro; Awake (copertina e frontespizio). Garamond (testo).

Edizioni *RomaTrE-Press* ©
Roma, dicembre 2020
ISBN 979-12-80060-93-8
http://romatrepress.uniroma3.it

FORTE
FONDAZIONE ROMA TRE-EDUCATION

L'attività della *RomaTrE-Press* è svolta nell'ambito della
Fondazione Roma Tre-Education, piazza della Repubblica 10, 00185 Roma.

Contents

Introduction

In 2019, the Department of Economics of Roma Tre University engaged in a reflection on its research activity, which led firstly to the organisation of the Research Days held on May 16th and 17th 2019[1], and then to the composition of the present volume. The purpose of this work is, first and foremost, to provide an exhaustive presentation of the many lines of research in which the Department's members are engaged, in order to encourage and foster possible national and international collaborations with scholars working on subjects that are among those addressed in the Department or related to them. Moreover, since research activities both influence and enrich the teaching offer provided by the Department, a further aim of the volume is to provide Italian and foreign advanced students with information about the interests they will be able to pursue should they enrol in the Department's master degree or PhD programmes.

The volume has in fact been written by the members of the Department, who have outlined their own research projects, which have only been made formally homogeneous and organised into chapters by the editor of the volume. In most cases, the bundling of the projects was suggested by the work of the Department's research teams, who, in describing their own lines of research, explicitly linked them to other lines present in the Department. Only a few times did the editor intervene by identifying links between research themes that appeared to be isolated.

While the Department is mainly composed of theoretical and applied economists and economic policy analysts, it also relies on the contribution

[1] Cf. De Muro, Fratini and Naccarato (eds), *Economics, Policy and Law. Proceedings of the Research Days, Department of Economics*, Roma TrE-Press.

of a number of scholars of quantitative sciences who both apply their tools to economic issues and address them in their more theoretical and methodological aspects. The significant presence of jurists also finds expression both in the analysis of connections between law and economics and in purely juridical research. A further peculiarity of the Department stems from the presence of researches traditionally housed in departments of business economics: scholars of corporate finance develop works that are closely connected with those of economists studying finance and monetary economics. Finally, there are also scholars dealing with marketing and business organisation issues.

The volume's table of contents provides an overall picture of the research activity carried out in the Department and indicates, for each research project, the scholars involved, be they affiliated to the Department or external to it. In addition, the name index placed at the end of the volume makes it possible to immediately identify the various projects in which each individual member of the Department is engaged.

The purpose of stimulating the interaction with external scholars and students has led us to illustrate both more consolidated lines of research that have already produced publications, indicating possible future developments, and lines of research that have not yet led to published works. In the description of the lines of research, we have chosen not to include either the bibliographic references or the publications already produced by members of the Department, as any search engine website can provide this type of information on the particular line of research that should arouse the interest of a reader of this volume.

The preparation of this volume benefited from the valuable editorial work of Dr Francesca Zaccarelli first and Dr Daria Pignalosa later. Finally, it is worth stressing that many of the research projects here described take advantage of the skills and the enthusiasm of young researchers and PhD students who are an important, albeit unfortunately not permanently integrated part of the Department.

Rome, November 2020

List of contributors

Addis, Michela. Department of Economics, Roma Tre University.
Antenucci, Fabrizio. Department of Economics, Roma Tre University.
Atripaldi, Mariangela. Department of Economics, Roma Tre University.
Benedetto, Francesco. Department of Economics, Roma Tre University.
Bloise, Gaetano. Department of Economics, Roma Tre University.
Cappelli, Federica. Department of Economics, Roma Tre University.
Causi, Marco. Department of Economics, Roma Tre University.
Ciccone, Roberto. Department of Economics, Roma Tre University.
Ciucciovino, Silvia. Department of Economics, Roma Tre University.
Conigliani, Caterina. Department of Economics, Roma Tre University.
Costantini, Valeria. Department of Economics, Roma Tre University.
Crescenzi, Riccardo. Department of Economics, Roma Tre University.
Crespi, Francesco. Department of Economics, Roma Tre University.
D'Agostino, Giorgio. Department of Economics, Roma Tre University.
De Filippis, Fabrizio. Department of Economics, Roma Tre University.
De Muro, Paolo. Department of Economics, Roma Tre University.
Deleidi, Mattteo. Department of Economics, Roma Tre University.
Dvoskin, Ariel. CONICET – IDAES, National University of San Martín.
Fontanari, Claudia. Department of Economics, Roma Tre University.
Fratini, Saverio Maria. Department of Economics, Roma Tre University.
Fusacchia, Ilaria. Department of Economics, Roma Tre University.
Giua, Mara. Department of Economics, Roma Tre University.
Giuli, Francesco. Department of Economics, Roma Tre University.
Giunta, Anna. Department of Economics, Roma Tre University.
Guizzi, Valentina. Department of Economics, Roma Tre University.
Iafrate, Francesca. Department of Economics, Roma Tre University.
Iorio, Martina. Department of Economics, Roma Tre University.
Iorio, Paolo. Department of Economics, Roma Tre University.
Larzeni, Samuele. Italian Regulatory Authority for Energy, Networks and Environment.
Lazzara, Paolo. Department of Economics, Roma Tre University.
Lelo, Keti. Department of Business Economics, Roma Tre University.
Levrero, Enrico Sergio. Department of Economics, Roma Tre University.
Liberati, Paolo. Department of Economics, Roma Tre University.

Lo Schiavo, Luca. Italian Regulatory Authority for Energy, Networks and Environment.
Longobucco, Francesco. Department of Economics, Roma Tre University.
Macioce, Francesco. Department of Economics, Roma Tre University.
Marotta, Egidio. Department of Economics, Roma Tre University.
Mastroeni, Loretta. Department of Economics, Roma Tre University.
Masulli, Michele. Department of Economics, Roma Tre University.
Monni, Salvatore. Department of Economics, Roma Tre University.
Morresi, Ottorino. Department of Economics, Roma Tre University.
Mortera, Julia. Department of Economics, Roma Tre University.
Mulazzi, Floriana. Department of Economics, Roma Tre University.
Naccarato, Alessia. Department of Economics, Roma Tre University.
Nenci, Silvia. Department of Economics, Roma Tre University.
Paglialunga, Elena. Department of Economics, Roma Tre University.
Palumbo, Antonella. Department of Economics, Roma Tre University.
Pariboni, Riccardo. Department of Economics and Statistics, University of Siena.
Paternesi Meloni, Walter. Department of Economics, Roma Tre University.
Piergigli, Valeria. Department of Law, University of Siena.
Pierucci, Eleonora. Department of Economics, Roma Tre University.
Pietrobelli, Carlo. Department of Economics, Roma Tre University.
Pignalosa, Daria. Department of Economics, Roma Tre University.
Salvatici, Luca. Department of Economics, Roma Tre University.
Scarano, Giovanni. Department of Economics, Roma Tre University.
Scarlato, Margherita. Department of Economics, Roma Tre University.
Sforna, Giorgia. Department of Economics, Roma Tre University.
Spinesi, Luca. Department of Economics, Roma Tre University.
Stirati, Antonella. Department of Economics, Roma Tre University.
Tedeschi, Simone. Department of Economics, Roma Tre University.
Termini, Valeria. Department of Economics, Roma Tre University.
Terzi, Silvia. Department of Economics, Roma Tre University.
Tirelli, Mario. Department of Economics, Roma Tre University.
Trabucchi, Paolo. Department of Economics, Roma Tre University.
Trezzini, Attilio. Department of Economics, Roma Tre University.
Tridico, Pasquale. Department of Economics, Roma Tre University.
Venanzi, Daniela. Department of Economics, Roma Tre University.
Vicard, Paola. Department of Economics, Roma Tre University.

Chapter 1

The reappraisal of the classical approach to the theory of prices and distribution

Spreading over several areas of investigation, this strand of research is placed into the resumption of the classical approach to the explanation of distribution, which started with Sraffa's rediscovery of the logical structure of classical theory and his solution of central analytical problems in respect to price theory, which had not been satisfactorily dealt with by the classical authors. Some general lines of the research are outlined below.

1.1 Wages and the labour market

E.S. Levrero, A. Stirati, W. Paternesi Meloni

A fundamental element of the classical approach to income distribution is the explanation of real wages, which are regarded as being affected by two main factors: (1) the historically determined living standards of the workers and (2) the bargaining position of the parties. The former factor is what the classical economists used to call the subsistence minimum, a 'floor' under which actual wages cannot persistently fall. The circumstances influencing the bargaining position of workers, hence their ability to raise wages above subsistence, can be of an institutional, political and economic nature, and in this respect an important role is played by labour market conditions, and especially by the share of unemployed or underemployed workers. Indeed, in the classical view unemployment is expected to be a common feature of a market economy, because that theoretical framework does not envisage any inherent tendency of capitalist economies to operate at or near full employment.

The absence of an inherent tendency to full employment also explains why in the classical approach free competition does not entail a fall in wages as long as an excess supply of labour persists. While the relative strength

of workers in wage bargaining determines the normal wage around which competition will act, this will only push the economy towards a condition of uniform rate of profits and uniform wages and rent from the same kind of labour and land – a tendency which operates within a set of social norms, laws and habits that, whether consciously or not, are respected in intentional competitive behaviour.
KEYWORDS: income distribution; wage; classical approach; unemployment; free competition.

1.2 Income distribution and the monetary nature of the interest rate

E.S. Levrero, R. Ciccone, M. Deleidi

While maintaining the idea of a determination of distribution based on historical-institutional factors, a partially alternative path has been taken in some contributions of contemporary literature that assume the interest rate, hence the profit rate, as the distributive variable on which the historical-institutional influences that regulate distribution manifest themselves in the first place. The starting point of this view resides in the monetary nature of the interest rate as stressed by Keynes and subsequent Keynesian economists and it suggests that monetary authorities, by shaping the structure of interest rates, may have an influence on income distribution. Several issues are still open, however, in this respect, from the relation between policy interest rates and the long term interest rates on risk-free assets, to the ability of Central Bank to influence *real* (rather than nominal) long term interest rates, the elements shaping the normal profits of enterprise, the mechanisms through which the rate of profits would adjust to a change in the long term interest rate shaped by the Central Bank.
KEYWORDS: income distribution; the interest rate; profit; monetary policy.

Chapter 2

Critique of mainstream theories of prices and distribution

As known, Sraffa's analysis has given rise to a broad critical debate centred on the notion of capital as a homogenous factor of production proper to the original formulations of marginalist theories. Along this line of theoretical reasoning, then, the emerging of versions of intertemporal economic general equilibrium was considered as an attempt to overcome the contradictions that the critique originating from Sraffa's contribution pinpointed. Recent developments have thus aimed to extend to these more recent formulations of the theory the original critique of the way in which the use of heterogeneous capital goods is represented in marginalist theories. On the other hand, the Sraffian analysis has generated a deep knowledge of the structure of neoclassical theories that allows to develop critiques of recent formulations of neoclassical theories which are not centred on the question of capital but on other independent logical contradictions within those theories.

2.1 The role of capital in the production process and the critique of the neoclassical theory of distribution

S.M. Fratini, E.S. Levrero, P. Trabucchi

Following Sraffa (1960), there are two different standpoints about the production process. According to the first of them, production is a circular process: commodities are produced by means of commodities, with labour services and the use of different natural resources. The difference between the bundle of commodities obtained as outputs and the one necessary to enable the repetition of the production process is the social surplus, whose division among social classes – workers, landowners and capitalists – is grounded on the class conflict.

By contrast, with the second view, production is a one-way avenue:

final outputs are produced by means of factors of production, namely labour, land and capital. These factors are supplied by households and demanded by firms. Their prices (or the prices for their use) – wage rate, rent rate and interest rate – are set by market equilibrium and linked to their (relative) scarcity and productivity.

The debates on the theory of capital are primarily devoted to challenge this second perspective and the explanation of income distribution as a market phenomenon it entails. Important results along this direction were already achieved. In particular, in the well-known symposium on the *Quarterly Journal of Economics*, in 1966, Samuelson explicitly admitted that there is no unambiguous way to say that one process of production is more capital-intensive than another. And this is tantamount to stating that the marginalist idea of substitutability between factors has no scientific ground.

A new stage of the debate was open about the relevance of these results for the neo-Walrasian theory. In fact, in this latter approach, the production processes are not assumed to employ factors of production, but 'Arrow-Debreu commodities', namely goods and services with date and place of delivery. Notwithstanding a number of contributions are already there, this part of the debate cannot be considered as closed.

KEYWORDS: theory of capital; neoclassical theory of distribution; Walrasian theory; production process.

2.2 The critique of the Neowalrasian approach

P. Trabucchi, A. Dvoskin

By abandoning the condition of a uniform rate of profit, the Neowalrasian approach has introduced a major fracture in the history of economic thought. And yet this approach was originally presented in the 1930s, and has since been generally perceived, as a simple 'extension in a dynamic direction' (Hicks, 1934) of the traditional theory. It appears therefore that a necessary preliminary step in order to take a position on today's dominant economic theory is to go back to the origins of the Neowalrasian approach and, in particular, to Hicks' *Value and Capital* (1939). What we find by so doing is (a) that, contrary to what Hicks himself has claimed, the Neowalrasian theory does not appear to be based on an intended relationship between theoretical variables and observable magnitudes that is significantly different from the one that can be found in traditional economic theory; and (b) that, owing to its treatment of capital, in order to establish that relationship the Neowalrasian theory has to introduce as necessary (albeit not sufficient) conditions assumptions on the functioning of the market which the theory itself feels should only be introduced as expository devices. For this exchange between necessary conditions and expository devices, by itself a considerable obstacle in the way of a clear perception of the nature of the theory, we find evidence starting from the Neowalrasian literature immediately subsequent to Hicks up to the textbook (Mas Colell, Whinston and Green, 1995) that in the last twenty years has been the almost indispensable starting point for advanced studies in economic theory.

KEYWORDS: Hicksian week; equilibrium; Neowalrasian theory; *Value and Capital*.

2.3 Other critiques of neoclassical theories: critique of the Euler equation approach to the explanation of saving behaviour

D. Pignalosa

The mainstream theory of consumption rests on the idea that individuals maximize lifetime utility subject to an intertemporal budget constraint. This analytical framework is based on the theories developed in the 1950s by Modigliani and Friedman, and extended by Hall (1978) to the case of uncertainty. The idea of Hall was to derive a set of orthogonality conditions from the consumption Euler equation which allow to both test the validity of the model and to estimate the structural parameters of the utility function. The subsequent literature has performed Euler equation estimation for one or the other purpose. Two lines of research concern this approach.

A first line of research deals with the literature focused on testing the model of intertemporal choice, which, in the 1980s, has identified a number of empirical puzzles and has therefore dedicated the subsequent decades to progressively modifying and enriching the original model so as to render it able to explain the data. The reconstruction leads to argue that the introduction of highly specific assumptions, needed to reconcile theory and empirical evidence, affects the generality of the theoretical conclusions of the model and, since no consensus seems to have emerged on which extensions should be adopted in defining the general approach to consumption, the analytical content of the theory appears to some extent ambiguous.

The second line of research deals with the literature focused on the employ of the Euler equation for estimating preference parameters (risk aversion, prudence, and the elasticity of intertemporal substitution), whose results are controversial. The purpose of this line of research is to highlight the neglected role that may have been played by the constraints that the quantitative definition of the parameters on the one hand and the utility functions employed on the other impose on the estimation.

KEYWORDS: consumption function; Euler equation; life cycle model; preference parameters.

Chapter 3

Activity levels, accumulation and growth in the Classical-Keynesian approach

The reappraisal of the classical approach has led to highlight that with regard to the levels of activity of the economy, the classical theory of prices and distribution is consistent with the Keynesian principle of effective demand. On the other hand, this reappraisal has generated a criticism of neoclassical principles leading to deny any automatic mechanism ensuring the tendency of the system to the full employment of available resources. This has led to the emergence of the so-called classical-Keynesian approach, which is part of the vaster literature that studies growth and accumulation of capital from a demand-led growth perspective, like the neo-Kaleckian and neo-Harrodian approaches, but appears grounded on a theory of value and distribution entirely independent of neoclassical principles.

3.1 Capacity utilization in the long period and the analysis of investment

R. Ciccone, A. Palumbo, D. Pignalosa, A. Trezzini

As happens in all approaches that start from a demand-led growth perspective, the classical-Keynesian approach analyses in depth the mechanisms through which productive capacity adjusts over time to the dynamics of aggregate demand. A crucial analytical issue, in this respect, is the methodological question of whether the study of growth processes should or should not be carried on by means of the hypothetical construct of ‘fully adjusted situations’, in which normal distribution and relative prices are deemed to be associated with a full matching of production capacity and demand in all industries.

A basic premise of this line of research is precisely the denial that the tendency of prices towards normal values requires that total existing capacity be correspondingly used at the normal rate – i.e., the exact alignment between the level of aggregate demand and the size of overall capacity. Indeed, it is argued that the tendency towards normal relative prices is potentially faster than the process of adjusting capacity to demand for the economy as a whole – so that normal prices could in principle prevail even under conditions of generalized excess capacity. Part of this argument is the acknowledgement that, at the sectoral level, it is through changes in capacity utilization that capital mobility may start to respond to profitability differences.

- The research is further articulated in the following strands:
- The analysis of the role of fluctuations and of fixed capital durability and indivisibility in the growth process; their consequences on fixed investment decisions;
- The critical analysis of the so-called Harrodian instability, and the analysis through simulation models of capacity adjustment mechanisms;
- A theoretical and historical analysis of the notion of 'normal capacity utilization' and of its determinants;
- A modelling of 'normal capacity utilization' consistent with the basic theoretical tenets of the classical-Keynesian approach.

KEYWORDS: capacity utilization; demand-led growth; Harrodian instability.

3.2 Demand-led growth, potential output and productivity: theoretical and empirical analysis

C. Fontanari, A. Palumbo, W. Paternesi Meloni, A. Stirati

This line of research deals with the theoretical, empirical and political implications of the demand-led perspective for the analysis of growth. According to prevailing wisdom, aggregate demand shocks determine only short-run cyclical fluctuations around a supply-determined (potential) equilibrium growth rate and an associated equilibrium unemployment rate (or NAIRU). However, this view has been called into question by various streams of literature in the last decades. Specifically, a recently revived literature on hysteresis finds significant persistence in the effects of recessions and negative aggregate demand shocks. In a nutshell, what we are questioning is whether hysteresis should be considered a 'distortion' in the working of market economies that holds only in specific circumstances – as the mainstream literature has generally suggested – or whether it is, in fact, a pervasive phenomenon which holds most of the time: in this latter case, aggregate demand is likely to affect also potential output by stimulating capital accumulation and labour productivity.

To investigate these issues, this line of research is articulated in different interconnected themes:

- The correct theoretical definition of potential output and the theoretical analysis of the relationship between actual and potential output in a demand-led growth context;
- The critique of the standard econometric methods for the estimation of potential output on the basis of their flawed theoretical bases and their poor results (in terms of volatility and unreliability of estimates);
- The proposal of alternative methods for potential output estimation, consistent with the demand-led growth perspective, aimed to show the great margins for demand and output expansion that normally characterize market economies;
- The analysis of the (alleged) tendency to return to a supply-determined potential output, independent of aggregate demand, after episodes of demand expansion.
- The analysis of the possible endogenous nature of labour productivity, and its dependence on output growth (this is also pursued by means of a reassessment of the Kaldor-Verdoorn Law);
- The role of the 'autonomous' components of demand (especially exports and government spending) in shaping the economy's long-period paths of growth, as well as labour productivity dynamics.

KEYWORDS: potential output; growth; aggregate demand; productivity; hysteresis; Kaldor-Verdoorn.

3.3 The role of consumption in the process of accumulation and growth

D. Pignalosa, A. Trezzini

Within the classical-Keynesian approach to the analysis of growth and accumulation, a possible role of the expansion of private consumption as a source of endogenous growth has been identified. This role is exerted through the asymmetric behaviour of consumer spending with respect to changes in aggregate disposable income. This implies that the level of aggregate consumption grows on average over the cyclical fluctuations. A line of research, in which much work has already been done, aims at further developing the reconstruction of the evolution and transformation of the theoretical principles that allow both to explain the aforementioned asymmetry and to identify the consequent effects on growth. Classical economists, American Institutionalists, Keynesian economists and marginalist theorists have all, in different forms and ways, identified the social role of consumption as the origin of such asymmetry and have studied its effects on growth with extremely different implications. The theoretical framework offered by the classical-Keynesian approach to the analysis of growth and accumulation seems to be the only one capable of correctly framing the theoretical hypothesis and explicitly grasping its expansive effects.

The conception of consumption as a social phenomenon guided the first econometric analyses of the determinants of aggregate consumption. On the contrary, this conception has a very limited role in current empirical analysis. A further line of research consists, therefore, in identifying data and methods for an empirical analysis able to verify the possible existence of the positive effects of the expansion of consumption in the process of growth and accumulation.

KEYWORDS: conspicuous consumption; demand-led growth.

Chapter 4

The reappraisal and the extension to the long run of the Keynesian approach to economic policy

The definition of a theoretical approach to the determination of output and accumulation along classical and Keynesian theoretical lines implies the possibility of revisiting many economic policy issues without assuming any tendency to full employment in the long run, which is conceptually generated by the neoclassical factor substitution mechanisms based on flexibility of prices and rates of remuneration of productive factors. This frees economic policy arguments from the traditional trade off established in the analyses that have as their conceptual reference the 'Pareto optimum'.

4.1 Fiscal policies and public debt

R. Ciccone, F. Iafrate, M. Deleidi, E.S. Levrero

The conception guiding this line of research sees in the expenditure of the community, determined at least in part independently of aggregate production, the normal determinant of the latter. In general, and in the absence of deliberate policies, this overall expenditure will be insufficient to guarantee a level of production compatible with the full use of existing resources, and in particular of the available workforce.

On the basis of this premise, public sector expenditure appears to be one of the elements that form, both directly and by inducing further spending, aggregate expenditure, and therefore determine the level of total output. Being a non-temporary component of overall demand, its influence on the levels of production in turn takes on a persistent character.

A central result of the work has been to show analytically that once a positive influence of public expenditure on total output is acknowledged, an *inverse* relation may hold, also in the long run, between levels of deficit spending and values of the ratio of public debt to domestic product. This result suggests that if a lower debt ratio constitutes a target of economic policy, as is currently the case in several countries, then, regardless of the validity or otherwise of that objective, restrictive fiscal policies may prove ineffective and even self-defeating by generating higher rather than lower values of the debt ratio. On the contrary, deficit spending would be superior to fiscal retrenchment with regard not only to levels of activity and employment but also to what is often referred to as an index of solidity of the financial position of governments.

Further aspects of the research are the critique addressed to the so called 'Ricardian equivalence' and the condition of zero present value for the future stock of public debt, particularly with regard to the rationality of private sector's behaviour on which both notions are supposed to be based.

Furthermore, this line of research focuses on the estimation of fiscal multipliers as well as the effect of alternative types of fiscal policies (e.g., public investment *vs* public consumption; military spending *vs* non-military spending) on the main macroeconomic variables, namely employment, business investment and debt to GDP ratio. To do this, we make use of advanced time series and panel data techniques on US and European countries data. Part of this research is carried out in collaboration with the *Institute for Innovation and Public Purpose* (University College London) in order to evaluate and assess from a theoretical and empirical standpoint the macroeconomic effects of public investment in innovation.

KEYWORDS: fiscal policies; public debt; fiscal multipliers.

4.2 Monetary policy, interest rates and the banking system

R. Ciccone, M. Deleidi, E.S. Levrero

This stream of research focuses on the analysis, from both a theoretical and empirical standpoint, of the role played by central and commercial banks in advanced economies. Specifically, it focuses on the determinants of monetary aggregates by assessing the endogenous and the exogenous money theories. This has also allowed to evaluate the effect of the recent asset purchase programs carried out by advanced countries in terms of credit creation for households and firms. In line with the recent studies carried out by the Bank of England, the research has shown the relevant role played by the banking system in affecting monetary aggregates, namely deposits and monetary reserves.

Additionally, the research aims to estimate the main monetary policy transmission mechanisms in advanced countries by implementing time series techniques. This study focuses on three main aspects of the transmission mechanisms. First of all, it aims at assessing the effect of short-run interest rates set by the central banks on long-run interest rates paid on 10 years' government bonds. Second, following the 'price puzzle' literature, it aims at detecting the effect of the interest rate on the level of prices. The purpose was also to show that a positive effect of a monetary policy tightening on the level of prices is to be considered as a normal phenomenon rather than an 'anomaly'. Since interest on advanced capital is part of the monetary costs of production, a change in the interest rate produces a direct effect on the level of prices by means of a mechanism which is typically defined as 'cost channel'. Finally, the research also wants to evaluate the effect of monetary policy on the main macroeconomic variables, such as consumption, investment and net export, by analysing the effect of changes in the official interest rates on money and credit, asset prices, bank rates and the exchange rate. The initial findings show that monetary policy has a low impact on output and employment growth.

A further line of research concerning the banking sector and its connections with the 'real' sector is about the profitability of capital invested in bank activity in relation to the general profitability of capital in the economy. This perspective implies, on the one hand, considering the differential between lending interest rates and deposit (and in general borrowing) interest rates as a determining factor for bank profits, and, on the other hand, specifying the link between the profitability of bank capital and that of capital employed in other productive sectors. An interesting implication of this study is the need to specify which of the funds available to banks should be properly conceived as capital employed in their activity.

KEYWORDS: monetary policy; transmission mechanisms; interest rates; endogenous and ex-ogenous money theories; price puzzle; profitability of banking capital.

4.3 Neoliberalism, welfare state retrenchments, austerity, financialisation and crisis: many faces of the same coin

F. Antenucci, R. Pariboni, W. Paternesi Meloni, P. Tridico

It is reasonable to assume that the ongoing economic crisis has its roots in the socio-economic context and the political economy paradigm emerged since the 1980s. In particular, if globalization does not go hand in hand with an expansion of the welfare state, which contributes to aggregate demand through direct and indirect wage increases, economic and social instability emerges. In other words, according to this view, the welfare state does not hinder the economic performance and competitiveness of a country, nor it is a barrier for its efficiency. In Europe, countries with a more generous welfare state tend to perform better in terms of GDP growth and employment. Within this framework, a comparative analysis was developed that looks at GDP and labour productivity growth, the evolution of different welfare regimes and labour market performances. It was then elaborated a new classification of welfare regimes, based on the polarization between 'Welfare Capitalism' and 'Financial Capitalism'. Countries belonging to the former group not only have a more equitable income distribution, but also tend to grow at a faster pace, especially in recent years.

On the other hand, countries in the second group present more pronounced inequality and, in general, experiment relatively worse economic performances. It seems, indeed, to emerge a trilemma between globalization, welfare and financialisation, which has been the object of this stream of research.

KEYWORDS: neoliberalism; financialisation; labour markets; globalization; income distribution.

Chapter 5

The intellectual evolution of Piero Sraffa

5.1 Sraffa's first manuscripts from the 'Early Synthesis' to the 'turning point'

S.M. Fratini, E.S. Levrero, A. Trezzini

The analysis of different groups of manuscripts of the period 1921-1931 (those labelled 'Up to 1927', 'Miscellaneous theory 1928-31', the so-called 'pre-lectures' and the manuscripts directly prepared and used by Sraffa for his lectures on Advanced Theory of Value) allows to reconstruct Sraffa's intellectual path to *Production of Commodities by Means of Commodities*.

The earlier manuscripts among this set deal with the notion of classical theory of value in Marshall's analysis. The reflection on utility played a crucial role in the subsequent analysis of the evolution of economic theories while that on cost, returns and production ripened soon into what has been called 'The Early Synthesis'. In this 'synthesis', Sraffa essentially accepted Marshall's supply-and-demand approach and, accordingly, believed that the classical theory of value rested on the assumption of constant returns to scale. This erroneous belief – as stressed by Garegnani – was instead absent in the text of the lectures delivered from October 1928, proving that a change occurred in Sraffa's theoretical and interpretative position in the meanwhile. According to Garegnani's reconstruction, between 1927 and 1928 a turning point took place in Sraffa's position.

Through a laborious process of successive and increasingly radical criticism of Marshall's approach and the progressive rediscovery of the classical theories, in a few months Sraffa came to understand clearly that classical political economy was an approach to the theory of value radically different and alternative to that of modern theories developed on the basis of the notion of marginal utility: an interpretation of the relationship between the classical economists and marginalism opposed to that proposed by Marshall.

On the other hand, the reconstruction of the evolution of economic theory led Sraffa to focus on the debate on the *ultimate standard of value*; he substantially rejected all the positions expressed by the different authors who took part in the debate. Sraffa thought that an ultimate standard of value was, however, required. That idea led Sraffa toward the conception of the *physical real cost* – namely the amount of commodity necessary to enable production – and this was the first step on his path toward his 'first equations'. By means of these equations, Sraffa realized – as early as 1928 – that 'the conditions of exchange are entirely determined by the conditions of production'. The way to *Production of Commodities* was open.
KEYWORDS: Marshall's supply-and-demand approach; classical theory of value; Garegnani; Sraffa; physical real cost; *Production of Commodities*.

5.2 Towards *Production of Commodities*

R. Ciccone, P. Trabucchi

This part of the work on Sraffa's manuscripts concerns a selection of papers dated or datable 1955-1959 and relating to the preparation of parts I and III of *Production of Commodities by Means of Commodities*. A great portion of the papers of those years consists of drafts of paragraphs of the book, written and re-written, sometimes with minor variations, in the meticulous search for a satisfactory formulation, so that what one can read in many of those papers is very close to the corresponding points of the book. Therefore, to serve the purpose of extracting a useful subset from that mass of papers, the selecting criterion which has suggested itself as natural has been that of privileging manuscripts which, on account either of their content, or their form or any other aspect, and of course according to the subjective evaluation of the editor, differ in some meaningful respect from what one finds in the book. The selection is at the moment organized in six chapters. Our Chaps. I to V contain papers referable to the Preface, to Chaps. I to VI and to Chap. XII of the book, while our Chap. VI presents papers which deal with subjects totally absent in the book. Interestingly enough, the latter group of papers includes manuscripts addressed to a critical approach to the marginalist theory that appears

different from, and additional to, the one relating to the notion of capital, which Sraffa himself initiates in the book.
KEYWORDS: *Production of Commodities*; critical approach to the marginalist theory; Sraffa.

5.3 Sraffa's relationship with Antonio Gramsci

A. Trezzini

The friendship between Piero Sraffa and Antonio Gramsci, two extraordinary intellectual figures of the twentieth century, has only been studied in detail and interpreted in the last two decades. The literature is now extensive and thorough on the historical and biographical aspects of the relation. The debate about their friendship in relation to the history of Italy, of the Italian Communist Party and the international Communist movement is very wide and varied. The investigation into the intellectual interaction between the two, however, is still incomplete. The reflection of the relationship between the two intellectuals on the themes of Gramsci's elaboration has been developed by philosophers, political scientists and by scholars of philosophy of language and glottology. On these themes, although the picture is not complete at all, the general lines are substantially outlined. It is the interrelation or lack of interrelation between the two intellectuals on economic issues (in particular on classical political economy and Marx) that has not yet been thoroughly investigated. The little work done comes from scholars of philosophy. A promising line of research is, therefore, the attempt to fill this gap by looking at the exchange between the two intellectuals from the point of view of the economist.
KEYWORDS: Sraffa; Gramsci; international Communist movement; Italian Communist Party; classical political economy; Marx.

Chapter 6

Public finance and public choices

6.1 Tax design and the economic effects of taxation

P. Liberati, F. Crespi, S. Tedeschi

This research line analyses both theoretically and empirically the design of the main taxes and how it has evolved over time, by comparing worldwide trends in tax reform. The economic analysis of these issues considers the effects of taxation on income distribution and incentives to work, saving and investment decisions, including those related to environmental friendly innovations. In particular research activities are carried out with respect to: personal income tax, corporate income tax, value added tax, energy and environmental taxes.

KEYWORDS: tax reforms; tax incidence.

6.2 Personal income tax

P. Liberati, F. Crespi

With respect to the personal income tax, the analysis is mainly focused on the debate on the 'flat tax', that continues to attract considerable attention in the policy arena. This research activity continuously reviews experiences with the flat tax, seeking to evaluate the effects of a similar reform in the Italian context. In particular, it has been shown that the distributional effects of the flat taxes are not unambiguously regressive, and that, in some cases and if correctly designed within an overall tax reform, they may increase horizontal equity.

KEYWORDS: personal income tax; flat tax.

6.3 Corporate income taxes and their effects on investment decisions

F. Crespi

The design of corporate income taxes is another issue which has long raised difficult questions because of the complex structure of corporate operations and the market structures. Moreover, the nature of these questions has evolved over the past few decades, as advances in economic theory, empirical evidence, and international policy context have strongly evolved over time. In this context particular emphasis is placed on the analysis of the effects of changes in corporate income taxes on corporate investment decisions, an issue which is crucial especially in the current context of stagnating economic activity.

KEYWORDS: corporate income tax.

6.4 Consumption taxes and their distributional impact

P. Liberati, S. Tedeschi

Another line of research activities focusses on the much debated issue of shifting the tax burden from labour and business incomes to less growth detrimental forms of taxation, such as consumption taxes. Yet, the empirical evidence on this issue is very narrow due to the unavailability of joint and detailed data on income and consumption. This research line tries to fill this gap by measuring the distributional impact of Vat in Italy using information on both households' expenditures and incomes integrated in a micro simulation model. The evidence obtained so far shows that the regressive profile of Vat in terms of disposable income is almost entirely driven by the very bottom and the top quantiles, which, however, at least in part, can be affected by temporary unalignments of income and consumption. Furthermore, it has been shown that the current Italian Vat structure is not optimally targeted to distributional aims and a different allocation of goods among the existing three rates could mitigate the regressive impact of the tax. In addition, unlike the common opinion that reducing the number of Vat rates would compromise distributional outcomes, it is shown that a two-rate Vat could have better distributional

effects compared to the current arrangement.
KEYWORDS: consumption tax; VAT; redistribution; Gini elasticity.

6.5 Redistribution and inequality

P. Liberati

Redistribution and inequality are at the forefront of the economic research since many years. On the empirical side, this line of research analyses how inequality has evolved over time and the power of the tax/benefit systems of different countries in changing the income and wealth distribution. This power has also changed over time, because economies have become more integrated and because, at least in some cases, the functioning of markets seems to have polarized the distribution of resources.

The traditional methods of redistributing income, i.e. taxes and monetary transfers, seem indeed to have lost some of their effectiveness. The first reason is that progressive taxes on incomes are more difficult to apply because of an extended mobility of production factors and because many income sources (e.g. incomes from capital) are in fact taxed with different regimes. Once personal and progressive taxes apply to a narrow tax base, it becomes difficult to hope in a wide and effective redistribution of incomes and wealth. To this purpose, indirect taxes seem even less effective, as the degree of redistribution that could be achieved by differentiating the rates of various forms of consumption taxes are usually not satisfactory.

On the other hand, both monetary and in-kind transfers are under stress because of their non-negligible budgetary implications in many countries. This occurs with regard to the main monetary transfers used to fight poverty, as well as with some important in-kind transfers like health and education that should guarantee an equality of opportunity. The result is often an uncoordinated system of taxation and public spending with debatable effects on the overall degree of inequality in many countries.
KEYWORDS: inequality; income redistribution.

6.6 Residential real estate prices; local public utilities and the role of territorial variables for their regulation
M. Causi

Residential real estate prices and their determinants at a micro-urban level are studied with application to the city of Rome through the statistical and econometric investigation of a micro data base collected by the Italian fiscal administration. The research has the objective of analysing the evolution and the determinants of rent gradients. Another objective is the analysis of the tax base for property tax and the measurement of the distortions implied by the use of cadastral values instead of market values.

Local public utilities are then studied taking into account the role of territorial variables for their regulation. The objective is to define the criteria for the definition of relevant markets from the territorial point of view.

KEYWORDS: residential real estate prices; rent gradients; property tax; local public utilities.

6.7 Individual preferences for social institutions
S. Tedeschi

The focus of this research strand is a theoretical and empirical investigation on the socio-economic, institutional and cultural factors which shape voters' preferences for different configurations of social institutions.

In particular, we aim to:

Determine – across individuals and countries – the relative salience of two political issues that are characterized by a certain degree of substitutability in terms of risk protection, such as formal social protection and market regulation;

Go in depth in the relationship between household income and individual preference for public education spending;

Analyse the political equilibria that determine different socio-institutional arrangements.

KEYWORDS: voters' preferences; socio-institutional arrangement; household income; public education spending.

Chapter 7

Climate change, local resources and socio-economic conditions in developing countries

Three main topics can be included under the common umbrella of this research line related to the challenging pressures climate change puts on the society and the economic systems: i) mitigation policies and technological patterns (jointly developed with a research team based at SPRU-University of Sussex, UK, coordinated by Karoline Rogge); ii) climate-related impacts in vulnerable countries, with a focus on conflicts and migration (jointly developed with a research team based at BC3-Bilbao, Spain, coordinated by Anil Markandya); iii) climate-induced catastrophic events and inequality (jointly developed with a research team based at INGENIO-Valencia, Spain, coordinated by Davide Consoli).

7.1 Climate change and mitigation policies: structural changes and technology patterns in economic systems

V. Costantini, E. Paglialunga, G. Sforna

Mitigation policies are increasingly adopted in developed countries and only recently emerging in less developed economies. The research has three specific objectives: i) to design optimal policy mixes that account for the role played by external policy and knowledge spillovers in order to minimize the economic efforts and maximize potential benefits arising from structural changes in terms of production efficiency and external competitiveness; ii) to analyse the impacts on the job market related to the introduction and diffusion of green technologies in terms of job creation or destruction, changes in the skills of workers and changes in wage distribution at the national and international level; iii) to adapt policy instruments of developed economies to the political environment of emerging and developing economies to foster transfer of abating

technologies to those countries currently crucial for respecting the abatement target of the Paris Agreement, while minimizing potential negative effects in terms of competitiveness loss and distribution inequality. The methodology is based upon a trade-based bilateral database including knowledge and policy spillovers for two selected technological domains associated with mitigation (energy efficiency and renewable electricity) where trade flows refer to single production stages along the production structure. The development of a two-stage econometric gravity model will allow to control for firms' heterogeneity via the computation of Inverse Mills Ratios (IMRs). Results obtained on a database for advanced economies as EU countries would provide policy advices for designing optimal policy mixes also in emerging and developing countries directly accounting for the role of external linkages along the whole supply value chain. By adding the composition of the labour market in terms of sector specialization (green and non-green) and skills (qualified and not) the multilateral linkages in terms of technological specialization and policy design will be used to discover the impacts on the labour market.
KEYWORDS: climate change policy; structural change; innovation; technological trajectories; export competitiveness.

7.2 Climate-related impacts in vulnerable countries: armed conflicts in Africa

F. Cappelli, C. Conigliani, V. Costantini, K. Lelo, E. Paglialunga, G. Sforna

This research line proposes an analysis of the multiple linkages between armed conflicts and climate-related variables based on an original geo-referenced database covering the entire African continent with a grid resolution of 1°x1° for the period 1990-2016. A dynamic spatial panel Durbin model is applied to detect both short and medium-term impacts of changes in climate-related variables as well the role played by spatial spillovers. Different channels explaining violent conflicts at the local scale level are jointly included, as resource abundance, socio-economic conditions and institutional quality. A conflict trap mechanism is empirically found through the dynamic econometric estimation that control for

persistence over time of conflicts. The spatial specification allows to quantify also the contagious effect across space, that persists in a radius of more than 300 km. Socio-economic conditions at the local level play a significant role in shaping the magnitude of conflicting events, as more populated places characterised by slow economic growth path are those suffering the higher probability to experience violent circumstances. Climate-related variables play a significant role in determining the strength and duration of armed conflicts, with different effects depending on the temporal horizon. It was found a strong link between an increase in temperature and conflict through both direct and indirect pathways by which temperature affects conflict levels in a given area. The increase in temperature particularly over a medium-term horizon seems to give impulse to conflicting actions, and this nexus is strongly reinforced by what occurs in neighbouring cells. It was also evinced that a constant reduction in rainfalls with respect to a medium-term benchmark reinforces the occurrence of conflicting events. This phenomenon seems to be more confined at the geographical scale since spillover effects are negligible.
KEYWORDS: climate change impacts; armed conflicts; conflict trap; georeferenced analysis; spatial dynamic econometrics; local spillovers.

7.3 Climate-induced catastrophic events and inequality

F. Cappelli, C. Conigliani, V. Costantini, E. Paglialunga, G. Sforna

Since climate change affects crucial aspects of human life, especially in developing countries, the climate-related effects on economic development are widely debated. There is a large amount of studies in the literature focusing on this relationship and the approaches employed range from the national scale of analysis to georeferenced studies. Similarly, economic development is measured in different ways, mainly as GDP per capita (among the others, Stern, 2006; Nordhaus, 2008; Mendelsohn *et al.*, 1994; Hitz and Smith, 2004) or as the number of people who live in the darkness at night (e.g. Klomp, 2016; Smith and Wills, 2018).

However, what is missing in the literature is a consideration of the distributional impacts of climate change. Taking equity out of the climate change research agenda leads to ignore the differential impact of climate change on income distribution in different communities, as well as the implications of the policies addressing it (Klinsky *et al.*, 2017). The inclusion of equity in the political agenda on climate change and, thus, of the principle of Common But Differentiated Responsibilities (CBDR), has been one of the most debated aspects since the earliest international negotiations (Gupta, 2012; Pauw, 2014).

Compared to the studies dealing with the effects on economic growth and development, research focusing on the distributional implication of climate change is very limited (among the main studies on the topic we find Azar and Sterner, 1996; Tol *et al.*, 2004; Mendelsohn *et al.*, 2006; Mideksa, 2010). The aim of this research project is to fill this gap by studying the relationship between climatic-induced catastrophic events and inequality.

However, the causal nexus is allegedly bidirectional. Accordingly, on the one hand, localities characterized by high economic inequality are usually more vulnerable to the impacts of climate change, being the intensity of the extreme events equal. On the other hand, catastrophic events occurring in low-resilient communities are likely to increase inequality. In this project, we explicitly address the problem of mutual causality, by building a system of two simultaneous equations. In the first one, inequality depends on the presence of a catastrophic event (a dummy equal to 1 if in a given country and in a specific year an extreme event was recorded) and other explanatory variables, including socioeconomic and climatic variables. In the second equation, the dependent variable is the intensity of extreme weather events, which can be proxied by the number of deaths induced by the event itself or the economic damage, in terms of recovery cost. As in the previous case, the explanatory variables include the presence of the catastrophic event, socioeconomic and climatic variables and, additionally, an index of economic inequality.

The research question posed is, thus, the following: what is the causal nexus existing between extreme climatic events and inequality? Nonetheless, the answer to this question depends on the scale of analysis considered, which is imposed by data availability. But whatever the scale considered, the research will present some advantages which cannot be replicated employing a different level of analysis. Indeed, a national-level scale of analysis, because of a greater data availability, allows to consider a larger number of countries and a longer time horizon, thus keeping into account the long-run effects of climate change. On the other hand, a geographically disaggregated level of analysis allows to identify territorial vulnerabilities and the hotspots where policy makers should intervene sooner.

In order to inform policy makers on climate action, considering the distributional impact of climate change (and not only the effects on growth and development) is extremely important. For this reason, there is the need to understand the direction through which this mechanism operates and whether climate change and inequality reinforce each other.

KEYWORDS: natural disasters; catastrophic events remote sensing; climatic damage; vulnerability; inequality; income distribution.

Chapter 8

Spatial inequality at the urban scale

8.1 Water and Social Innovation in the Brazilian Amazon

C. Conigliani, S. Monni, M. Iorio

This research line originates from AguaSociAL program, aimed at consolidating knowledge cooperation and sharing on water issues between Brazil and the European Union. It was conceived under the Seventh Framework Programme (FP7) and financed by the International Research Staff Exchange Scheme (IRSES) Marie Curie Actions. The project provides local training on water treatment techniques and technologies based on the social innovation approach. The principle of social innovation lays the foundations of the project, which in turn aims to enhance practical use of the research and to support the creation of new paradigms related to water resources management in the Brazilian Amazon. Pará and Amazonas states offered themselves as case studies, and were particularly interesting due to their abundance of natural resources and to the major challenges they face in terms of water treatment, as well as access to water as a common good. The Department of Economics of Roma Tre University has led the project since 2013, coordinating between other partners, such as Leeds Beckett University (United Kingdom), Universitat Autónoma de Barcelona (Spain), Universidade Federal do Pará – UFPA (Belém, Pará, Brazil) and Universidade do Estado do Amazonas – UEA (Manaus, Amazonas, Brazil). In particular, AguaSociAL sought to investigate and support techniques and technologies conceived by both local communities and academic teams in order to improve access to and treatment of water, facilitating R&D activities and social innovations in the Amazon Region. Beyond water treatment, the project focused on the identification of technologies for re-use and recycling, together with the identification of potential sanitation services that communities would accept and own. This particular approach strengthened the link between scientific knowledge and local traditions (knowledge sharing), while supporting a learning process targeting sustainable development. A key step was to evaluate the social and economic impact of exploiting low-cost water treatment techniques and technologies, in order to address fair and adequate solutions. The active participation of local communities, not only seen as basic users but also as main interlocutors, was a key factor for success in estimating the social and economic impact of interventions. Nevertheless, up to this day the main actors needed for the correct implementation of 'solutions' and the launch of a self-sustaining virtuous cycle at local and national level are the federal state (through majority ownership in energy and services enterprises) and the private sector. Training programs and multidisciplinary research have the scope to promote the elaboration of social innovations needed by the more exposed populations of the Amazonian region (acceptance technology). The project aims to involve vulnerable communities in specific key areas in the evaluation of their conditions and basic needs, drafting general guidelines that could support governance. European and Brazilian research institutions share knowledge and expertise as well as awareness on the importance of meeting the final goal of drinkable water for urban and rural communities in the Amazon.

KEYWORDS: Brazil; Legal Amazon; inequality; human development; water; social innovation.

8.2 Socio-Spatial and Urban Dynamics

S. Monni

Socio-economic inequalities in complex urban environments – typically large cities – have increasingly become a central issue in research, urban development programmes and policymaking. The subject is complex and multifaceted, therefore difficult to frame. When addressing spatial inequalities and urban deprivations, partially overlapping concepts such as quality of life, living quality, liveability, are often used as synonyms (Martínez, Pfeffer, Baud, 2016; van Kamp *et al.*, 2003). The lack of a comprehensive framework has stimulated a multitude of sectorial approaches. While economists use quantitative multi-dimensional measures combining income, life expectancy, level of education, such as the Human Development Index (UNDP), or the Gender Inequality Index, anthropologists and sociologists prefer dimensions defined by the inhabitants, which include not only material resources, but also access to collective resources, the presence of legal and social entitlements, the perception of quality and happiness (Baulch, Wood, Weber, 2006). Recently, geographic disparities at regional and local levels have been addressed in frameworks such as the Multidimensional Poverty Index (Alkire, Roche, Santos, Seth, 2013), which combines education, health and standard living conditions in one index, computed from household survey data. In our Department we focus our research on examining the spatial distribution of socioeconomic inequalities in the municipal territories of Italy's three most populous metropolitan cities, Rome, Milan and Naples, by means of economic and social indicators and with data aggregated at the sub-municipal subdivisions of the cities and the municipalities in their provinces (Lelo, Monni, Tomassi, 2019).

KEYWORDS: socio-spatial inequalities; mapping; periphery; Rome.

Chapter 9

Food security, human development and collective agency

9.1 Food Security and Human Development

P. De Muro

This research line originates from collaborations with some United Nations agencies. The first works concern the role of education in food security and include two empirical studies (De Muro, 2007; Burchi and De Muro, 2009), done for the project *Education for rural people* of FAO, which highlight the fundamental role of mothers' education in children food security. Subsequently, UNDP commissioned for its *2012 African Human Development Report* a background paper in which an analytical framework for the Report was developed, and in particular a capability approach to food security that could emphasize the two-way relations between human development and food security. Besides the background paper (Burchi and De Muro, 2012), a second version of the paper has then been published in the most important academic journal in the field (Burchi and De Muro, 2016). In both works, before developing an analytical framework that is operationally relevant, the authors made a critical review of the main approaches to food security.

KEYWORDS: capability approach; food security; human development.

9.2 Human development and Collective Agency

P. De Muro

This research line concerns the role of collective agency in human development. In particular, the role of organizations like genuine cooperatives and other associations of small producers in fostering human development, social inclusion and poverty eradication, with a focus on rural areas of developing countries. On the basis of a theoretical framework

(Vicari and De Muro, 2012; Bellanca *et al.*, 2010; De Muro, Monni, Vicari, 2016), founded mainly on the *capability approach* and especially on the concept of *agency* (individual and collective), some empirical studies have been done: on Italian cooperative firms engaged in reducing poverty in developing countries (Vicari, De Muro, Marcone, 2009); on the impact of an important development project in Tanzania in support of an organization of small producers (Burchi, De Muro, Vicari, 2015). In Spring 2018, in collaboration with FAO and some national organizations, an international research project has started on the contribution and propensity of cooperatives and other producer organizations in developing countries to poverty reduction, with a focus on the inclusion of the poorest. The study concerns a panel of organizations representing the various developing regions (East Asia, Eastern Europe, Sub-Saharan Africa, South Asia, Latin America) and envisages field surveys, with the utilization of both quantitative and qualitative methods.

KEYWORDS: collective agency in human development; cooperative; small producers; social inclusion; poverty eradication.

Chapter 10

Evaluation of welfare and labour market policies

10.1 Evaluation of labour market reforms in Italy

M. Scarlato, G. D'Agostino

Over the last decade, there has been a considerable increase in the number of young people unemployed in several European countries. Against this background, apprenticeship has received much attention from policy makers as a means to improve the opportunities of youth and address skill imbalances in Europe by establishing a better match of workers' skills to firm needs. Based on new administrative data, we aim at estimating the causal effect on wages and employability of the mobility of apprentices after graduation in Italy. This research line infers the impact of training on apprentices' skills and productivity by estimating the effect on wages of job mobility among prime-aged graduates from apprenticeship in Italy, both within the economic sector of the training firm and across different economic sectors. It adopts an instrumental variable (IV) approach, exploiting time and regional variation of labour market characteristics to control for selection bias and confounding factors.

Analysing the effect on wages of mobility after graduation allows us to speculate on several issues. First, when apprenticeship provides firm-specific human capital, it is expected that mobility of graduates across firms involves a loss of the human capital component that is not transferable to the new job and that this effect translates into a wage loss. Second, it is supposed that the wage gap between stayers (i.e., graduates who do not switch their job) and job switchers is larger when the apprentice shifts to a job in a different economic sector. Last, when apprenticeship also provides general human capital, one would expect that mobility across firms and sectors involves just a small, presumably temporary, wage loss.

From the perspective of the impact on labour market equality, our estimates show the following: first, significant disparities among graduates

from apprenticeship have emerged in terms of work intensity and pay, and, second, these disparities have increased after the liberalisation of the contract introduced by the Biagi Law. Overall, the evidence provided by our analysis suggests that the spread of the apprenticeship contract in Italy over the last twenty years might have contributed to increasing the labour earnings inequality among similar young workers. This result is particularly relevant to understanding possible mechanisms driving the emergence of within inequalities in the Italian labour market.
KEYWORDS: apprenticeship training; job mobility; wages; instrumental variable estimation.

10.2 Evaluation of the effects of social transfers on income inequality in OECD countries

M. Scarlato, G. D'Agostino

Income inequality has increased significantly in most OECD countries over the past three decades and an open question remains why rich countries show this long-term trend. The debate has focused on the growing role of finance – and increasing returns to capital – including wealth, and globalisation and skill-biased technological change. These factors in the Western economies are generally associated with market deregulation, weaker labour market institutions and the transfer of power to supranational institutions which, in turn, have reduced the room of manoeuvring of governments.

The present research contributes to this literature by estimating the causal relationship between social transfers and disposable income inequality for a large panel of OECD countries. It refers to the theoretical framework proposed by Iversen (2005) and Iversen and Soskice (2006) to deal adequately with the key variable characterization. The model suggests that the electoral systems and government partisanships affect redistribution policies when heterogeneous optimising behaviour of parties or coalitions are included which, in turn, generate cross-country differences in income inequality. To evince so, the research exploits the interaction between electoral systems and the coalitions winning the elections to instrument the cited relationship in an IV framework. Empirically, it focuses on the 'pure' effect of social spending implemented through its cash components on income inequality, whereas the in-kind social spending (i.e., the provision of health care, education spending and other services) is accounted only indirectly.

KEYWORDS: welfare policy; social spending; income inequality; instrumental variable estimation.

Chapter 11

Energy transition and sustainable growth

The energy transition is well on the way. A new energy model is emerging, founded on renewable sources – wind, solar, water, geothermal, sea waves, biofuel – and gas, the least polluting among fossil fuels. Several drivers press in favour of this transformation – they include the urgency of addressing climate change by decreasing CO2 emissions from fossil fuels; a new push of technical innovation in the digital domain which is applied to power generation and transports; the pressure to provide energy access in regions lacking adequate infrastructures. Besides, innovation on other fronts has greatly reduced the costs of renewable energy sources, making them competitive relative to fossil fuels.

Contrasting forces, however, are also strong. They include, among others, the actions of key players – firms and governments – historically profiting from the oil industrial chain; new 'unconventional' fossil resources – tight oil and shale gas – recently found in the US are also contributing to slow down the process towards a greener economy. Yet, this pattern of change cannot be stopped: in fact, the general goal of this research is to contribute to the understanding of the dynamics of its implementation and its economic consequences, as well as the social and financial impact that we might expect for the next decades.

The research line includes four sub-groups which focus on different though connected issues, i.e.: renewable sources and digital innovation; regulation and policies for sustainable growth, with a specific reference to the EU approach; changes in the economic and geopolitical order of global energy value chains and the increasing role of the green finance; finally, it investigates risk, entropy and price formation.

11.1 Renewable sources and digital innovation

L. Lo Schiavo, V. Termini

Digital innovation and new materials have built a new infrastructural framework, the so-called 'smart environment', based on smart grids, smart meters, batteries, new electric appliances and electricity remote control, that have deeply modified both supply and demand in the energy chain.

Yet again, the new energy model is producing social and economic effects on the industrial domain and on the lives of citizens. On the industrial side it triggers a Schumpeterian process for the utilities and the firms of the energy production chain and it paves the way to the supply of new services. Citizens, on their side, will become responsible for their own energy production and would be able in the future to sell the electricity they produce locally, from renewable sources.

This research group focuses on the effects of the integration of power and digital innovations, from three separate but interconnected perspectives:

a) the need of high scale investment in 'smart' digital infrastructures is analysed; it includes coordination issues and the analysis of new challenges for energy security. The empirical part is dedicated to verifying the implementation of the EU strategy, as it has been defined by the Energy Union (2015);

b) the impact of distributed electricity generation on cities and local areas is also analysed.

c) Finally, from a macroeconomic perspective, the new services and job opportunities linked to the use of electric platforms and hybrid transports are enquired, to valuate recent forecasts by Irena, the UN Agency on Renewables and IEA, the International Energy Agency, that suggest that green energy should provide a global stimulus to growth and new jobs.

Making specific forecasts on future scenarios is an impossible task, though some evidence of recent macroeconomic trends may help. For example, decoupling energy consumption from economic growth is considered in different cycle contexts and in response to alternative energy efficiency policies.

KEYWORDS: power and digital integration; renewable sources; EU; employment and growth.

11.2 Policies for sustainable growth: goals, features and results of the EU approach

S. Larzeni, V. Termini

Power generation and transports are responsible for the greatest part of CO2 emissions in the atmosphere: accordingly, regulation and climate policies play a role to promote the energy transition towards sustainable growth. Though the goal is global, its implementation is local; this research group specifically focuses on public policies of EU member states to promote, guide and regulate the new path through fiscal, financial and industrial policies, which provide useful evidence to understand the alternative paths of the transition.

The new function of regulation of promoting risky investment while protecting citizens from rent seeking incumbents is specifically analysed, as innovative tools are needed to define tariffs and price mechanisms and to provide transparent incentives to innovative firms. These are analysed in a comparative study of EU Member States (MS) and US approaches – carbon taxes, ETS, fiscal and financial incentives to support the decarbonisation of the economies.

Yet, this research group also enquires how the EU unsettled governance is responsible for the limited results reached by EU policies up thus far. The analysis of MS data is drawn to understand whether and how different energy mixes, different degrees of energy import dependence, different industrial and institutional structures drive MS to different approaches to energy transition, thus hindering the implementation of a EU common strategy and energy policy.

KEYWORDS: energy policy; regulation and policies for sustainable growth; EU governance and energy policy.

11.3 Carbon tax with heterogeneous willingness to pay

L. Spinesi

This research project aims at studying the long run implications of a carbon tax intended to reducing the polluting emissions. In order to face the negative consequences of climate change, governments are implementing domestic environmental policies which typically come at a cost to the individuals, like higher product prices and taxes. The empirical analyses have found a heterogeneous willing to pay (WTP) of individuals in supporting such climate change policies. This paper nests such empirical findings within an R&D-driven growth model with polluting and clean energy sources, where asymmetric information about heterogeneous WTP is accounted for. Under very mild assumptions of the economic set-up, contrary to common wisdom, a high tax rate on polluting emissions is found to increase the aggregate innovation incentive and the per capita GDP growth rate, with no harm on profit flows of polluting firms.

KEYWORDS: willingness to pay; government policy; technological innovation; environment and growth, R&D.

11.4 Environmental regulation, energy taxation and innovation performance

V. Costantini, F. Crespi

This research line is dedicated to investigate whether and to what extent energy and environmental policy instruments including regulations and environmental and energy taxes have been relevant forces behind the adoption of environmental innovations. In so doing, it focuses on technological and organisational innovations of product and process nature. Incremental and radical features are also scrutinised. The attention is thus on the ex post assessments of eco-innovation drivers, looking at single and interaction effects of policies.

The analysis investigates on both ‘drivers and obstacles’ of innovation with some focus on the complementarities and trade-offs among different public policy tools within the adopted policy mix through an empirical investigation of the role played by selected characteristics of the policy mix in inducing innovation in clean energy technologies.

As a case study we develop an original dataset covering 23 OECD countries over the period 1990-2010 combining the full set of policies in the energy efficiency domain with data on patents applied over the same period in this technological sector. The econometric results suggest that when the policy mix is characterised by a more balanced use in demand-pull and technology-push instruments, its positive effects on eco-innovation tend to be greater. Moreover, a more comprehensive policy mix is shown to be able to enhance innovation activities for the generation of new clean energy technologies. However, the simple addition of an indiscriminate number of simultaneous policy instruments may reduce policy mix effectiveness. Finally, the empirical findings confirm previous evidence on the importance of policy spillover effects, and suggest that policy similarity between countries may represent an important aspect to be accounted for in policy mix design.

KEYWORDS: eco-innovation; policy mix; balance; comprehensiveness; policy spillovers; energy policy.

11.5 Radical changes in the global energy value chains. Game changers and contrasting forces: economic and geopolitical impacts

P. Iorio, M. Masulli, V. Termini

The revolution of 'unconventional' oil and gas resources and their rapid growth in the US have changed the global organization of oil and gas markets. Price cycles have also been affected, contributing to the global increase on economic uncertainty.

This third research group analyses the changes of the *global energy chains* and focuses on the economic impact and the expected geopolitical consequences of the energy transformation. It enquires into the transformation of global oil, gas and coal markets and into the rebalancing of regional economic power brought about by the energy transition. It studies the industrial chain of renewable sources, from the extraction of the new minerals needed for the accumulation of electricity – cobalt and

potassium among others –, to the new road from producing to consuming countries. Finally, it elaborates on *green finance* data.
KEYWORDS: energy global value chain; green finance.

11.6 Co-existence of stochastic and chaotic behaviour in Energy Commodities Markets

L. Mastroeni

Energy commodities have a great importance in the energy market, both for their presence in everyday's life and their use in a number of industrial applications. The fluctuation of their prices, which can be observed even on very short timescales, has several important consequences, as it reflects in end price changes and interferes with a correct planning of industrial activities, in addition to spur financial speculation and the possible formation of bubbles.

Forecasting the behaviour of such prices has therefore been the subject of many research efforts. Though the large mainstream of activities has revolved around the use of statistical tools, an alternative approach emerged at the end of the eighties, which adopted a nonlinear deterministic paradigm (called chaos) instead of a stochastic one. A steady streak of papers has been published since then to assess whether the chaotic approach could replace the stochastic one. All studies relied on the analysis of the time series of prices as observed on the major markets, and all arrived at a sharp conclusion: either support or reject the chaotic paradigm.

However, this dichotomy does not need to be a strict rule. Actually, the research advocates that feature of both worlds may coexist in the same phenomenon. In addition, all the papers mentioned above adopted tools that were based on the assumption that either paradigm is present, but not both, which may lead to strong biases in the results.

It also refines the analysis of chaotic behaviour in energy commodities prices by incorporating the presence of noise in the estimation of chaotic features.

Moreover, our results involve the intermittency phenomenon, which means the recurrence of regime switching between periods of regular

behaviour (laminar phases) and periods of chaotic behaviour. This could explain the emergence of bubble-related value of a good that emerged without any fundamental cause.
KEYWORDS: energy commodities; chaos; futures; entropy.

11.7 Emissions, fuel-switch and energy-mix: the impacts of emission trading systems on the power sector

L. Mastroeni

The problem of controlling and reducing the emissions of CO2 (and other greenhouse gases, GHG) is obtaining (hopefully) a high priority among the concerns of the national governments and all the major ONG worldwide. As it is well known, CO2 and the other GHG are the main responsible of the climate changes currently occurring on our planet. A large consensus exists that human activities are contributing significantly to increase the concentrations of GHG in the atmosphere. Several environmental policies have been therefore proposed and adopted in many countries to promote a transformation on a large scale of our society towards a low-carbon model.

In particular, in 2014, the EU reaffirmed the importance of pursuing a low-carbon economy and proposed a framework for EU climate and energy policies in the period from 2020 to 2030 which builds targets for GHG emissions, renewable energy and energy savings.

Among the different environmental policy mechanisms, the prominent one is certainly the ETS. An emission market is established to exchange emission certificates. This system has been variously criticized for different reasons.

In this research it is wondered if the ETS is really an effective mechanism to convert the current producing systems towards the low carbon paradigm. Central to the analysis developed in our research is the fact that the most relevant sector within an ETS is by far that of electricity. In the case of the European ETS (EU ETS) the energy sector (which includes power and heating) has totalled 64% of emission certificates in 2017. Given such a dominating position, the features of the power sector need to be carefully examined with respect to the possible interaction with an ETS.

KEYWORDS: emissions trading system; optimal energy-mix; fuel switch.

11.8 Advanced data processing methods for Energy Commodities Markets

F. Benedetto, L. Mastroeni

Over the years, increases in oil prices volatility caused a lot of concern among consumers, corporations and governments because of the important role played by crude oil in the world economy. Oil price volatility is a key input into macro-econometric models, portfolio selection models, and risk measurement. Thus, modeling and forecasting the volatility of crude oil prices represent critical issues in both policy and financial arenas.

Accordingly, it is not surprising that, most notably recently, a large volume of literature has emerged on the need for advanced data processing methods, such as modeling and forecasting volatility in commodity markets. Most of this research has focused on energy markets and in particular on oil volatility.

The literature on modeling and forecasting the volatility of energy commodities uses generalized autoregressive conditional heteroscedasticity (GARCH) family models. A popular alternative to GARCH is the implied volatility (IV) model. In this case, volatility is estimated by applying 'VIX' methodology to oil option, obtaining the option implied volatility represented by CBOE crude oil ETF volatility index (OVX). The OVX is available since May 2007 and reflects market expectation of 30-day volatility of crude oil returns. Many studies investigate the predictive content of implied volatility of financial asset such as stock index but few attentions are paid to implied volatility of crude oil.

In this environment, the research examines the information content of OVX relating it to volatility of WTI and Brent oil returns, paying attention on the predictability of the last two from the first. In particular, it focuses on the first two of the aforementioned questions and we wonder whether knowing OVX information allow us to deduce the information content enclosed in the spot volatility. Besides, we wonder whether knowing OVX information allow us to deduce the information content enclosed in the Brent oil volatility.

The methodology that is employed in this research line takes entropy as the metric for evaluating the information transmission between OVX and spot volatility of WTI and Brent oil returns, and has the advantage that it does not require any parametric models and tools.

KEYWORDS: financial data processing; entropy analysis; energy commodities markets; volatility forecasting.

11.9 Bayesian analysis of complex dependence structures and risk in energy markets

P. Vicard, V. Guizzi

The study of energy markets started from data provided by Enel on products, prices and energy demand of the Colombian energy market. Energy markets are generally characterized by a high complexity due to several reasons including the large number of variables involved, different by nature, and their associative structure. The project started from the study of a simple energy market such as the Colombian one with the aim of implementing the application of Bayesian networks to industrial portfolios in order to take decisions about the production level of the various energy types according the demand and the availability of energy from renewable sources. Since the variables of interest are quantitative but not Gaussian, the non-parametric Bayesian networks were used to learn the associative structure of the Colombian market. Through the selected model we want to study possible scenarios with particular attention to the impact of hydroelectric production level on the energy price. The goal is to analyse energy portfolio choices and how they act on the EBTDA index. To this end, Bayesian networks can be used together with control theory, using a dynamic model that also takes into account the risk factor to assess the consequences of a decision (or series of decisions) by studying the repercussions on the overall system whose variables are associated with each other causing a propagation of the effects of an action. The work was carried out in collaboration with Flaminia Musella and Vincenzina Vitale.

KEYWORDS: Bayesian networks; energy economics; portfolio selection; structural learning; what-if analysis.

Chapter 12

Global markets and local policies

12.1 Economics and Policy of territories in a globalized world: drivers, conditioning factors and impacts

R. Crescenzi, F. De Filippis, M. Giua, S. Nenci, E. Pierucci, C. Pietrobelli, L. Salvatici

The research focuses on the dynamics of economic growth and development involving regions, cities, economic sectors, firms and other actors within the globalized world. It studies how the different growth determinants shape the global competitiveness of local areas, with particular attention to the role of innovative activities, internationalization patterns and sectorial dynamics. The interest is also in the role of territorial embedded assets (such as tacit knowledge, relational proximities, formal and informal institutions, governance) in determining the global trajectories of local areas. It is studied the potential and the weaknesses of the traditional sectors, with a massive work on Italian and European agriculture, and of the most innovative activities, associated to the flows of foreign direct investments, multinational's location and international trade.

A large part of our research is focused on the policy side of these local-global dynamics. With particular attention to the Italian and the European context, it is investigated the evolution of the policy's paradigm, the implementation structure and the economic impact achieved by the most important policies targeted to firms, sectors and regions at the local, national and communitarian level. Much was written about origins and evolution of Common Agricultural Policy and of Cohesion Policy, investigating the effects of the most relevant reforms, the theoretical and the political background of shift of the policy paradigms towards a place-based approach and the existence of a European value added for these policies. By relying on counterfactual methods, it was evaluated the ex-post impact on growth and employment of the European Structural Funds in the most disadvantaged areas of the Union and in different national contexts. Working at the micro level, it was estimated how some of the most relevant innovation policies affect firms' economic performance. The focus is now on the role of policies promoting internationalization throughout the attraction of foreign investments; connecting global competitiveness' drivers to the local economy and promoting relevant sectorial and local productions in the global value chains.

KEYWORDS: regional growth; regional policies; Common Agricultural Policy; rural development; policy evaluation; European Union; firms' internationalization.

12.2 International trade policies

F. De Filippis, A. Giunta, S. Nenci, C. Pietrobelli, L. Salvatici

Economic wide assessment of multi-lateral and free trade agreements falls often short of supporting the complexity of trade policy design and negotiations related to agri-food markets and supply chains. While economists agree that further global market integration boosts overall welfare, it is doubtful that winners will compensate losers, especially if gains and losses are rather unequally distributed over supply chains, over consumers and producers, over space (between Member States and regions inside Member States) or different household types. Furthermore, global integration of agri-food markets is also one of several reasons of growing consumer concerns about food quality and safety as well as the way food is produced.

Firstly, it was studied the theoretical underpinning and methodologies of partial and general equilibrium models in ex-ante trade assessments thereby taking into account recent developments in trade theory, in particular in micro-modelling. Secondly, it was used micro-level evidence to make the link throughout the supply chains in the global but also EU regional context, and thirdly, related to that, by integrating the econometrical estimation at micro- and macro-level into existing simulation models thereby improving evidence based results for trade policy analysis. From a policy point of view, it is important to better understand the impact that trade policies will have at different scales – globally, for the EU as a whole, as well as for its member states and regions – and to better

understand who will lose and gain. The latter includes distinct effects beyond standard welfare effects that are linked to the sustainable development goals. With negotiations of several bilateral or regional trade agreements on the agenda, and trade wars becoming a reality, this line of research is important for governments, producer and consumers in the EU and in partner countries as well as EU citizens in general.
KEYWORDS: WTO; regional trade agreements; trade policies.

12.3 Natural resources and mining: trade, innovation and development

C. Pietrobelli, L. Salvatici

The mining sector is a very important activity for many developing countries. Still, it has had limited success in sparking a process of economic transformation and diversification spreading to other activities. As the experience of fast industrializers shows, this transformation is intrinsically related to the process of innovation and spillovers leading to the creation of value in existing sectors, as well as to the emergence of new sectors in the economy. Unlike what happened in the mining sector in advanced countries, in Latin America the local provision of intermediate inputs and services is still limited, and confined to the second and third lower value-added tiers of the mining value chains.

However, the recent evolution of the industry is creating interesting opportunities for local suppliers, that are related to: (i) the need that mining companies are facing to outsource and make production more efficient; (ii) the emergence of new solutions to extracting and manufacturing activities derived from advances in relevant branches of science and technology, such as biotechnology and ICT; (iii) the search for local solutions required to address technological, environmental, and social challenges that are increasingly local; and (iv) the emerging accumulation of scientific, technological and manufacturing skills in several layers of local companies in LAC. Still, these opportunities for domestic suppliers and local content can only be exploited provided that some underlying conditions be fulfilled. These conditions are related, for example, to the development of local technological competences, to a governance of the mining value chains that allows and fosters the development and upgrading of local suppliers, and the availability of an institutional setting that allows encompassing the social, environmental, and production-related demands within a coherent framework.

This recent analysis focused on the experience of mining value chains in Latin America, and the opportunities for innovation and linkages associated to mining activities in Argentina, Brazil, Chile and Peru. Three types of opportunities were researched: demand side, supply side and local specificities. The last source of opportunities is key for natural resource related activities. The evidence shows that an increasing demand is introducing important incentives for innovation and local suppliers. Nevertheless, a hierarchical value chain, dominated by few large firms, and poor linkages is blocking the diffusion of innovations and hindering suppliers' development. The emergence of a group of highly innovative suppliers, which were identified in the four countries, is explained mostly by new technological and knowledge opportunities, which are not exploited by large incumbents and open spaces for new entrants. Local specificities are also key in the explanation of local suppliers. However, it remains a challenge how these, most of which were created to satisfy local needs, will move from local to global.

KEYWORDS: natural resources; mining; innovation global value chains; Latin America; local specificities.

12.4 Global value chains

I. Fusacchia, A. Giunta, S. Nenci, C. Pietrobelli, L. Salvatici

For at least twenty-five years – with growing involvement, intensity, and geographical extent – the manufacture of a good has been divided into phases so that it takes the form of a sequence of tasks assigned to firms located in very different places. Global value chains (henceforth GVCs) reflect this distinctive pattern of the international division of production.

The organization of production in GVCs is a phenomenon of great importance. At the macro level, it has a significant impact on the productive specialization of individual countries, which now in large part compete on individual phases (for example, R&D, Design, Assembly, Logistics) rather than on final goods, which in fact are now 'made in the world'. At the micro level, it offers opportunities of various kinds to firms, depending on their positioning and the capacity to move along the GVC and settle on more remunerative tasks.

Firstly, the research focused on firm level data with the aim to analyse: a) the impact of firms' positioning along the GVC on their performance; b) the form and the organisation of the relationships, i.e. the governance, among the various actors involved in GVC and their implications on firms' performance and country's development; c) the endogenous process of technological capability development, including specific firm-level efforts, and the mechanisms allowing knowledge to flow within and between different GVCs; d) the role of agglomeration economies and the quality of institutions on different typology of firms participating in the GVCs.

Secondly, from a macro and industry point of view, the focus shifted on inter-country input output tables and matrix of bilateral trade flows mainly for analysing the relationship between GVCs structure and trade policies. Indeed, GVCs alter government incentives to impose trade protection because: a) goods that cross national borders multiple times incur multiple tariff costs; b) tariffs on imports may have a depressing impact on the domestic value added content embodied in partner countries' exports.

KEYWORDS: global value chains; firms' organization; technological capabilities; firms' internationalization; trade in value added; multiregion input-output tables; trade policy.

12.5 Historical trade analysis

S. Nenci

Historically the global economy has been characterized by major shifts in patterns of International trade. Understanding the changing nature of economic relations between countries is crucial, as a matter of economic history (O'Rourke and Williamson, 1999 and 2002), but also in informing the work of other disciplines – be this politics, international relations, or international economics.

Economists and researchers make intensive use of historical international trade statistics, as can be seen by the high citation frequencies for the data compendiums of Maddison (2006) and Mitchell (2003) and Bairoch (1973, 1974, and 1976). Quantitative analyses of developments in global trade from historical perspective, using different techniques, have been recently developed. Recent contributions have been focused mainly on the following topics: the impact of trade costs on market integration and commercial/financial policies as main driving forces to explain trade integration in the long run.

Given the availability of new and reliable historical trade dataset, the aim of this research activity is to analyse the long run patterns of world trade to provide a broader and deeper perspective on the evolution of the international economy and through this a better understanding of the relationship between economic performance, the international trading system, international relations, and domestic political and social change. More specifically, our goal is to apply up-to-date quantitative methods to the study of historical phenomena. Impact evaluation techniques, network analysis and gravity models will be applied in order to carry out empirical analyses using these new data.

The focus of this research activity will be on the second half of 19th and first half of 20th century history.

KEYWORDS: international trade; historical data; network analysis; impact evaluation; gravity models.

12.6 Redistribution and international/intranational risk sharing: channels and determinants

E. Pierucci

The present research deals with the study of risk sharing and redistribution at international, national, regional and microeconomic level aiming at measuring channels through which shocks are absorbed and examining determinants of risk sharing. Risk-sharing is the possibility of a full diversification of idiosyncratic risk, that is to say, countries can (potentially) completely smooth income and consumption across time and states of nature, and thus offset shocks to income and remain affected only by systemic risk. Instead, income redistribution aims at reducing inequalities in private consumption and endowment of local public goods or at supplying resources to promote regional development.

One line of research deals with measuring interregional risk sharing and redistribution operated by fiscal policy that implies the use of an indicator of net regional surpluses or deficits. Following a broad literature, we employ net fiscal flows (NFFs), defined as the difference between what the residents of a region contribute to the general (central, local and social security) government and what they gain from it in terms of public spending targeted to that region.

A second line of research seeks to assess the relationship between the economic and noneconomic aspects of globalization and international risk-sharing. By applying regression-based analyses augmented for interaction terms, we investigate whether a higher level of political (and/or social) integration improves risk-sharing, given a certain level of economic integration. We focus on the relationship between social/political globalization and risk-sharing.

A third line of research deals with risk sharing at household level, investigating the extent of channels of income smoothing and their determinants as well as the role of informal channels as measured by social capital variables (such as social networks, civic participation and neighbourhood attachment) on shocks absorption and unemployment spells.

KEYWORDS: international and intranational risk sharing; redistribution; convergence; economic, social and political integration; globalization; social capital; informal channels of insurance.

Chapter 13

Innovation, technology transfer, productivity and growth: industrial policy and Italian industry

13.1 Co-publishing, academic spinoffs and academic patenting in Italy

A. Giunta, E. Pierucci

This research analyses technology transfer looking at several different University-Industry interactions modes. The three main lines of research are the following. The first line of research deals with the determinants of university-industry collaborations examining individual, institutional and geographical factors as well as characteristics of universities and firms with a particular focus on science based industries such as the Biopharmaceutical. A second line analyses the impact of those policies aimed at promoting technology transfer on some third mission indicators. In particular, it focuses on the study of performance based research systems – introduced by an increasing number of EU countries since the Lisbon agenda – which include a number of established spinoffs among the measures of universities' third mission. The third line focuses on the role of patenting and academic patenting on firms' performances in terms of mark-up and profitability. Our research hypotheses are: i) patenting firms, compared to non-patenting firms, achieve a stronger position on the market, represented by a higher mark up; ii) academic patents generate better results compared to non-academic patents, given their characteristics of introducing companies into more advanced scientific fields, since higher patent quality can determine better performances.

KEYWORDS: technology transfer; university-industry collaborations; co-publishing; co-patenting; academic patenting; academic spin-offs; third mission.

13.2 Italian industrial structure

A. Giunta

'Italy is recovering after a deep and long recession. Structural reforms, accommodative monetary and fiscal conditions, and low commodity prices have helped the economy to turn the corner […] Yet, the recovery remains weak and productivity continues to decline' (OECD, 2017).

This line of research investigates: a) the main organizational characteristics and performance of Italian industrial structure, focusing on firms' productivity, internationalization, digitalization, R&D, innovation; b) the design of industrial policy and the evaluation of its impact.

KEYWORDS: Italian economy; firms' organization; firms' performance; industrial policy; policy impact evaluation; economic surveys.

13.3 The role of public procurement

A. Giunta

Public procurement is one of the key instruments of demand-oriented innovation policies that the public sector has used for the direct creation of markets, stimulating and promoting innovation and allowing new technologies to diffuse. Such purchases have historically occurred in a wide range of sectors such as defence, energy, health and transport by national agencies and in basic research by national and supranational organisations (e.g. NASA and CERN). Public procurement for innovation (PPI, henceforth) can take different forms and, in general, is meant to stimulate innovation by shaping the demand environment and the economic landscape in which suppliers operate.

This research line investigated how PPI affects firms' performance, focussing on the mechanisms that explain how public procurers can support learning and innovation in their industrial partners, and how these buyer-supplier relationships influence the latter's performance.

KEYWORDS: public procurement; industrial policy; innovation.

13.4 R&D financing and growth

L. Spinesi, M. Tirelli

R&D investments are an important engine of growth and development. Yet economists have often claimed under-investment, also due to the asymmetric information between inside investors and outside investors and financiers, and the consequent capital and financial market imperfections. Some recent empirical evidence robustly supports these claims. Motivated by this evidence, we study the effects of asymmetric information and financial frictions on R&D investment within a dynamic general equilibrium economy of Shumpeterian tradition. The model and equilibrium concept we propose is rich enough to represent investment and innovation decisions, financial decisions and decisions regarding technology adoption/diffusion through patent licensing. Qualitative predictions indicate that the financial policy of the firm matters in explaining both entrepreneurial production and innovation decisions. Young R&D-intensive firms might rely more heavily on internal sources and equity than on debt financing, relatively to what would otherwise be observed in absence of frictions. These findings contribute to explain the type of financial hierarchy recently highlighted in empirical studies.

KEYWORDS: innovation; R&D; Shumpeterian growth; intertemporal firm choice; firm financial structure; asymmetric information; general equilibrium.

13.5 Innovation, innovation policy and development

C. Pietrobelli

Innovation is an essential determinant of growth and development. Innovation is the result of a systemic interaction among many actors including firms, research centres and universities, Government organizations. However, due to missing or non-existing markets, to imperfections and failures of coordination and other problems that frequently occur in a market economy, innovation requires well-designed and implemented policies to prosper.

This research work scrutinizes various elements of innovation and innovation policy, often with a specific reference to developing countries. This list of selected publications may give an idea of the main themes analysed in recent years.
KEYWORDS: innovation; public-private collaboration; innovation policy.

13.6 Why England? Original capital accumulation before the Industrial Revolution
L. Spinesi

This research project aims at analysing the fundamental aspects that determine the preconditions of the industrial revolution in England during the period 1400-1750. The transition out of agriculture is an essential step to usher developing countries into the sustained growth path. This paper shows that the historical experience worldwide should be taken into account in analysing current developing economies. It is shown that the more favourable conditions of England preparing the following path of sustained growth occurred in the rural areas. In particular, it was the joint combination of both farm and non-farm production organization in rural areas, known as protoindustry, and the favourable conditions of relatively low agricultural productivity and free mobility of labor between cities and rural areas, which increased English chances to start the Industrial revolution compared to other promising areas for industrialization at that time, such as Japan and China. Lessons for developing countries are straightforward.
KEYWORDS: capital accumulation; industrial revolution; UK; developing countries.

13.7 Knowledge, innovation and economic performances: towards the digital transformation
F. Crespi

Technological knowledge plays a central role in shaping the working of an economic system and its growth. The stock of technological knowledge available in the system is one of its crucial endowments; however, its effects are far from being automatic because of the special features of knowledge as an economic good. Building on a framework of analysis able to account not only for the size of the knowledge stock but also for its composition in its generation and in its exploitation, this line of research aims at analysing the following themes:

- Knowledge cumulativeness and innovation persistence;
- Knowledge complexity, innovation and economic performances;
- Drivers and impact of different Innovation Modes;
- The generation and diffusion of digital technologies;
- The transformative role and employment impacts of digital technologies.

KEYWORDS: knowledge; innovation; digital economy.

Chapter 14

Labour market, income distribution and poverty

14.1 The role of unemployment and other labour market indicators in affecting income distribution

W. Paternesi Meloni, A. Stirati

The last 40 years have witnessed a dramatic change in income distribution in all major industrialised countries. The interpretation of such changes in income distribution represents a challenge to economic analysis. Mainstream analyses, including New Keynesian ones, have encountered some difficulties in the interpretation of the changes in income distribution. Such difficulties are associated to the 'well behaved factor substitution' assumption, since this entails that only under very peculiar circumstances can large changes in income shares occur. Hence mainstream literature has pointed to labour saving technical change and international trade as underlying factors. Yet both explanations, at least in the version consistent with mainstream models, have encountered empirical problems (i.e., econometric results that undermine the role of technical innovation in negatively affecting the wage share in OECD countries; and evidence in contrast with mainstream international trade models). Although the heterodox approaches are multifaceted, many post-Keynesian and non-mainstream scholars can be represented as holding a 'conflict' and 'institutional' explanation of income distribution between wages and profits, while output and employment are determined by effective demand (also in the long-run). The advantage of such an approach to the phenomenon of distribution and employment is that it entails no *a priori* connections between the changes in distribution and the changes in the proportion between labour inputs and output; accordingly, decreases in nominal and real wages are not seen as the route which can lead to full employment, since employment levels depend, even in the long run, on effective demand. Therefore, if, for example, a change in the bargaining strength of the parties affects income distribution, the effects on income shares may be significant.

However, also concerning this broad approach some analytical and empirical questions emerge.

The first set of questions concerns the main channels through which income distribution has been affected (changes in labour market conditions and institutions; increase in the interest rate; changes in firms' governance and balance of power among different stakeholders). The second set of questions concerns the weight of 'globalization' and 'financialisation' in affecting distribution.

The main purpose of this line of research is to critically discuss the explanations of the observed changes in income shares that have been advanced in the literature, and in particular to assess the role of labour unemployment, unemployment duration, participation rates on 'functional' income distribution in the medium to long run. The focus is on aggregate real wage dynamics, given productivity growth. This is also connected with the increasing inequality. While the existing literature has analysed the impact of various institutional and economic features on income shares (labour market regulation, collective bargaining and union density, trade openness, financialisation, technical change), only very few have enquired into the role of unemployment, yet without a specific focus on this particular aspect. The purpose of this line of research is hence that of systematically analysing the role of such factors in affecting 'average' medium run real wage dynamics. In addition, it wills to enquire into the role of changes in labour market conditions in affecting labour market regulation and collective bargaining – the hypothesis to be tested being that a sharp worsening of labour market conditions may have triggered institutional and regulatory changes that have then persistently affected income distribution. In turn, changes in labour market conditions largely depend on GDP dynamics, with the latter determined according to our framework by aggregate demand.

KEYWORDS: income distribution; unemployment; labour market; bargaining power.

14.2 Sectoral and geographical distribution of low wage incidence in mature economies

W. Paternesi Meloni, A. Stirati

Recently, the empirical literature has pointed at an existing dualism in advanced economies, and particularly in the US, with a low-wage/low-productivity sector explaining most of the slow dynamics of both variables in the aggregate. The picture, in synthesis, is that of a 'Baumol disease' but without the cost push that would be there if wages in the low-productivity sector were keeping pace with wage growth in other employments. A tendency to polarization and dualism in US labour market is generally recognized. While much literature on low wages has concentrated on microdata analysis in order to detect personal characteristics leading to low-wage employment and/or persistence in such employments, this line of research is mostly concerned with the features of the industries and regions where there is greater incidence of low-wage employment. Some scholars, which analyse the impact of technology and trade on employment structure (but not wages) in local US labour markets could be a source of inspiration for investigating the regional characteristics leading to low-wage employment, while other works concerning the sectoral employment effects in the US of import penetration, could provide inspiration for the analysis of the impact of trade openness on low-wage incidence at sectoral level.

Concerning European countries, existing literature on comparative incidence of low wages has already shown that there are marked differences across countries (Ries, 2013) and that institutions matter; particularly, union density and collective bargaining coverage do affect the incidence of low-wage employment both overall and in specific industries.

This line of research is aimed at enquiring whether there are similarities or differences between US and European countries and among the latter. Particularly:

- The aggregate evolution of low-pay incidence and its relation with macroeconomic conditions and institutional features;
- The comparison of low-wage incidence by sector of activity. Are low-wage industries the same across countries? Do they exhibit similar patterns in terms of evolution of low-wage incidence? Is

increasing dualism in labour markets detectable in all or most countries?

- Do industries where low wage incidence is high present similar characteristics across countries in terms of output growth, employment growth, productivity, openness to international trade, firm size, collective bargaining coverage, skill requirements?
- Comparison of mean wages (in terms of purchasing power parity) across regions, particularly within the Eurozone and large Eurozone countries with the aim of testing whether monetary union and/or 2008 recession and subsequent policies have triggered wider centre-periphery diversity.

KEYWORDS: low wages; sectoral analysis; inequality; income distribution; productivity.

14.3 Structural change, labour flexibility and their implications for labour productivity stagnation

R. Pariboni, P. Tridico

A stream of research is devoted to structural change, institutional changes in the labour market – in particular labour flexibilisation – and their implications for the slowdown of labour productivity in Europe. Over the last three to four decades, many advanced economies have experienced significant changes in their productive structures and their industrial strategies. While the post-WWII period of expansion – qualified by some scholars as 'The Golden Age of Capitalism' – was characterized by the manufacturing industry exerting the leading role, in more recent years a massive shift in employment has been taking place in most Western countries. Indeed, a steady decline in the share of workers employed in manufacturing and a transition towards the service sector is a well-known feature of contemporary capitalism. This de-industrialization process went hand in hand, in most European countries and especially in Italy, with labour market reforms aiming at increase labour flexibility, diminish labour protection and increase precarious and temporary employment. The declared purpose was to increase competitiveness through labour cost's compressions, a process exacerbated by the deflationary policies imposed by the Economic and Monetary Union's constraints and by subsequent austerity measures in the aftermath of the Great Recession. As a result, the income share accruing to workers strongly decreased throughout most advanced economies. This contributed, however, to a generalized productivity slowdown. Indeed, labour cost's compressions lead to the adoption of labour-intensive, low-innovation productive strategies.

The generalized terziarization process, briefly sketched above, takes different shapes in different institutional contexts. Continental Europe countries maintain relatively high shares of manufacturing employment; Scandinavian countries tend to be specialized in hi-tech business services, complemented by a high share of public services' employment. Anglo-Saxon countries are characterized by the important role exerted by finance. Southern Europe countries, on the other hand, display an intensive transition towards services with reduced technological content and little room for innovation. This leads to the investigation of the connections between 'varieties of terziarization' and alternative post-Fordist growth trajectories. The linkages between the so-called 'Baumol's disease', labour market reforms and some insights that can be derived from the evolutionary literature have been submitted to empirical scrutiny, broadly confirming the theoretical hypotheses.

KEYWORDS: structural change; labour productivity; financialisation; de-industrialization; Baumol's disease.

14.4 Causes and consequences of recent trends in income distribution

R. Pariboni, P. Tridico

The purpose of this stream of research is to explain the determinants behind the decline of labour shares in the last three to four decades in OECD countries. In our view, this decline was determined by financialisation and was deepened by the structural changes that occurred almost simultaneously in those economies. Financialisation, or finance-dominated capitalism, from the 1980s onwards, was a key element in the strategic offensive of the advanced countries' dominant classes to appropriate higher shares of national income and to restore their control over the political process, a control that had been threatened by a generalized advancement of the labour movement in the 1970s. The development of a finance-dominated capitalism was helped by the process of globalization, which affected not only OECD countries but many others as well. A new, though unstable, macroeconomic model emerged, which we will call financial capitalism. In financial capitalism, trade unions lost power vis-à-vis capital, labour flexibility increased enormously, and a structural change from manufacturing to services was accelerated in rich countries. This resulted in negative consequences for the labour share and income inequality. The decline of the labour share and the increase of inequality negatively affected aggregate demand and GDP dynamics. Since the financial crisis of 2007-2008, recovery has been slow because it has been driven by the very same difficulties which generated the crisis, i.e., low wages, a higher profit share and a low level of investment in the productive sector. Instead, financial speculation and wastage of assets, short-term strategies in the financial sector, and shareholder value maximization are still the main principles, guiding behaviour in a finance-dominated capitalism. The theoretical hypotheses briefly sketched above have been submitted empirical scrutiny, by means of a panel analysis conducted for OECD countries.

KEYWORDS: labour share; income distribution; financialisation; financial capitalism; down-size-and-distribute.

14.5 Poverty lines, minimum wages and the implementation of policies against poverty

M. Deleidi, F. Iafrate, E.S. Levrero

The increasing amount of unemployment and working poor in advanced economies in the last decades has led attention again to the determination of absolute and relative poverty lines and their distinction from minimum wages. The aim of this research (carried out in collaboration with the Federal University of Rio de Janeiro) is to analyse the different methods which are used to calculate them in Argentine, Brazil, Italy, and the United States in

order to emphasize some missing elements that tend to underestimate poverty lines in the official statistics. It also aims to clarify theoretically the elements that should determine the bundle of necessary or basic goods which compose the subsistence wages of different kind of workers, as well as the way in which a change in the net social wage (namely, the value of social goods provided by the State net of taxation and social contributions) affects the minimum wages to be set in wage bargaining. The analysis will lead to distinguish the subsistence wage from a living income and will be grounded on contributions of different strands of thought.
KEYWORDS: poverty lines; subsistence wages; social wage.

14.6 Analysis of well-being, poverty and inequality
P. De Muro

This research line has a dual origin. On the one side, studies done with Matteo Mazziotta and Adriano Pareto, on the construction of 'balanced' composite indices of multidimensional phenomena like development and poverty, with an application to the *Millennium Development Goals* (De Muro, Mazziotta, Pareto, 2010 and 2011) and to European regions (De Muro, Mazziotta, Pareto and Talucci, 2012). On the other side, the National Research Project (PRIN) 2009 'Measuring human development and capabilities in Italy', in which Roma Tre participated with a research unit coordinated by Pasquale De Muro. The latter project started in October 2010 and ended with the international conference *Measuring Human Development and Capabilities* at Roma Tre in April 2014. The outputs of the Roma Tre research unit have been published between 2014 and 2017 and concern the theoretical and methodological analysis, based mainly on the *capability approach*, of the choice of dimensions and indicators of multidimensional measures of well-being and poverty (Burchi, De Muro and Kollar, 2014 and 2017; Burchi and De Muro, 2015a and 2015b). Such analysis has multidisciplinary nature as, besides economic and statistical components, it includes elements of political philosophy and in particular the 'political constructivism' of John Rawls.

In that research line it is also included a theoretical *paper* – presented at international conferences in 2014 and 2015 – on the need to re-conceptualize well-being and poverty in the light of the contributions by Smith, Marx and Sen (De Muro, 2015). Finally, in 2017 Burchi and De Muro presented at an international conference a reflection on the problems related to the inclusion of well-being indicators in the new Italian Budget Law (Burchi and De Muro, 2017).

More recently, this research line has been extended also to the multidimensional analysis of inequality. Firstly, a critical theoretical analysis has been developed (De Muro, 2016) and then an empirical study on Italy has been done and presented at national and international conferences (De Muro and Bechini, 2017).

KEYWORDS: well-being; capability approach; poverty; inequality; multi-dimensional analysis.

Chapter 15

Finance: corporate finance

15.1 Performance and risk of investment mutual funds

D. Venanzi

The objective of this research field is twofold. The first one is to analyse the differences among metrics, clarifying which performance is being measured, and verifying whether, and in which scenarios, the spread among metrics is actually relevant. The issue seems particularly relevant because, if the metrics matter, it should be reconsidered the criteria adopted for choosing the appropriate metrics for specific purposes (assessing the fund's manager abilities, assessing the fund's performance from the perspective of individual investors, assessing the performance of the asset management industry) as well as re-evaluate the adequacy of the performance measures published by the fund managers. Assessing the fund's manager abilities cannot be totally independent on the investment/disinvestment decisions: for many reasons, the assumed neutrality of the time-weighted approach with respect to the investors' choices is just theoretical, since the capital invested in the fund is variable, and the yearly return depends on fund managers' investment decisions that have been influenced by the distribution of flows during the year. In addition, when the manager's choices do influence the investor's subscriptions and withdrawals (the dominant role of the sellers in the mutual fund industry; the client's weakness, enhanced by the breadth, volatility, and dispersion of the product offerings; the almost total coincidence between fund managers and sellers, as for example in the Italian mutual fund industry; etc.), the distinction between the abilities of managers and sellers does not have any relevance for the investors and the overall economic system.

The second objective is to measure and empirically verify the fund managers' ability to beat passively managed and risk-comparable portfolios and breaking down the potential extra-returns into the various components of that ability. The research follows the Berk-Binsberger (2015) approach, by measuring the value the fund extracts from markets, in terms of the fund's gross excess return over its benchmark multiplied by assets under management, i.e. the value added of the fund. The analysis is conducted on a sample of actively managed Italian mutual funds (largely representative of the Italian mutual fund industry), evaluating managers by comparing their performance to the investor's alternative investment opportunity set, all actually available Vanguard index funds. Preliminary findings are: *i)* the average destruction of value (the 80% of funds presents a negative value added); *ii)* the time persistence of the worst funds; *iii)* investors are not able to infer managerial quality; *iv)* flexible funds present better performance and, among them, the larger ones outperform the smaller; *v)* manager activism results limited.

Further developments aim at extending the analysis to samples of European funds and explaining the determinants of the cross-sectional differences of performance.

KEYWORDS: investments; European funds; fund managers' ability; metrics' measurement.

15.2 Determinants of banks' risk: the fundamental beta revised

D. Venanzi

International empirical literature shows that CAPM effectively explains the cost of capital of banks. However, stock prices of financial companies are largely influenced by market noises and distorted by speculative trading. In this context, the fundamental beta approach, formulated by the pioneering study of Beaver-Kettler-Scholes (1970), appears to be worth of deepening. The objective is twofold: 1) to identify and empirically test the relevant determinants of systematic risk of banks (in a sample of European commercial banks); 2) to verify the better predictive power of the fundamental beta (expressed as function of these determinants) than market beta in forecasting beta of the following periods (especially in tail-zones of the true beta distribution). Preliminary empirical findings show that fundamental beta is significantly influenced by size, weight of noninterest income, balance sheet opacity, pay-out, cost efficiency and risk weighted asset (RWA) ratio. The last effect shows a counter-intuitive sign (negative rather than positive), more significant in the case of banks utilizing internal risk models, confirming recent findings on the distorting role of this indicator in measuring bank risk.

KEYWORDS: performance of mutual funds; measuring managerial skills in mutual fund industry; capital structure choice of small business; country effect on financial leverage; fundamental beta of banks; determinants of risk in banking sector; cost & benefit analysis of public investments.

15.3 The choice of capital structure; cost & benefit analysis of social/public investments

D. Venanzi

The choice of capital structure is a hot issue in international financial research. Since the Modigliani-Miller (1958) seminal contribution, many theories have been formulated and many empirical studies implemented. However, ample space for further research remains, since the empirical evidence does not always support the theoretical hypotheses and often stimulates the formulation and testing of new hypotheses.

In this context, two research lines seem to be good candidate for further analysis.

The first one is measuring the country effect on corporate financial leverage. Prior research finds that a firm's capital structure is not only influenced by firm- and industry-specific determinants, but also by country-specific factors: many country characteristics, such as the macroeconomic context, the institutional framework and the financial system, seem to affect (directly and indirectly) a firm's capital structure. The review of the international studies on country effect since 2000 identified some areas of criticism and potential development in empirical testing: the sample selection in terms of countries and firms, the variables to be considered, the measure of direct and indirect effects (in terms of mediating role of the impact of firm-specific determinants), the measurement of leverage, the test design and the statistical methodology, etc. The research aims at identifying and explaining the distorting effects of these methodological weaknesses.

Based on these findings, various empirical tests are (will be) conducted in order to measure and explain the country effect. These tests present the following original features from a methodological perspective: *i)* large samples of firms, which variously differ in terms of size and industry, including small and non-listed firms, whose financial decisions are more influenced by the institutional and financial constraints of their domestic markets; *ii)* sets of apparently homogeneous countries in terms of general characteristics, but actually different in detailed macro-economic, institutional and financial features; *iii)* a broad set of determinants, at firm, industry, and country level, breaking down each level in an ample set of variables; *iv)* an explanatory model of leverage that fits both the cross-sectional and the longitudinal variability of corporate leverage, avoiding the use of average values of dependent and independent variables over time; *v)* measuring both direct and indirect effects of country's impact on the capital structure choice in a model whose parameters are simultaneously estimated by means of a simultaneous equation model (SEM); *vi)* explicitly taking into account the Welch (2011) criticism on the measurement of firms' indebtedness, excluding the non-financial liabilities, that are generally related to the specific firm's business and industry characteristics, and are not influenced by the determinants of the capital structure choice, when it represents an explicit managerial decision; in Continental Europe countries, these non-financial liabilities can have a major weight on the total sources of funds, distorting the measurement of financial leverage, when included; *vii*) using realistic measures of the financial leverage, consistent with the typology of countries considered (in bank-based countries, including the short-term bank debt in financial debt, whose it represents a very important portion, since it often disguises medium-long term debt by means of the tacit renewal mechanism). Empirical findings are in progress.

The second line of research in this field is how realistically measuring the financial leverage of small and medium-sized firms and how effectively explaining (theoretically and empirically) their capital structure choice. Some common features of small- and medium-sized and privately held firms make the main theories on financial structure and the related empirical testing not applicable. In particular: *i)* leverage measured as the simple debt to equity ratio (from balance sheet) is biased since equity is understated and liabilities are overstated (i.e. the role of quasi-equity is not recognized, the owners' true equity contributions are underestimated, some assets are not reported, some liabilities are not detailed, etc.); *ii)* small businesses do not use the market rates for making financial decisions: founder's risk-attitude, entrepreneur's over-optimistic perception of opportunities, lack of external funding and fewer lenders, total risk vs systematic risk (owners' risk aversion: lack of diversification on their personal portfolio, unlimited liability and high personal bankruptcy costs make some owners hesitant to acquire large amount of debt), no or partial limited liability, etc.; *iii)* value of reputation and informal relationship: agency costs are reduced and monitoring/information acquisition are lower; *iv)* desire to maintain control (hold-on-power from lenders) and minimize agency costs; *v)* debt tax shield negative, high cost of bonding and monitoring (for external lenders), higher bankruptcy costs, greater opacity and asymmetric information, lesser ability to signal.

These features call for tailored theories as well as appropriate empirical test design. This research area aims at contributing to these two directions.

KEYWORDS: international finance; capital structure choice; country effect on financial leverage; cost & benefit analysis of public investments.

15.4 Optimal financial contracts with unobservable investment and cash flows

M. Tirelli

This research line is principally focused on firm financial and investment decisions in the presence of asymmetric information and incomplete contracts and of their effects on economic growth. This topic is relevant both to improve upon our analysis of economic dynamics and economic policy.

Data show that business that are suffering from asymmetric information can be typically found among young companies which are family-owned, unlisted, of small or medium size (SME), with an elementary management structure, a low capitalization and are particularly active in highly innovative sectors (e.g. see Berger and Udell, 1998 and see the survey by Abdulsaleh and Worthington, 2013). Moreover, even in developed countries, unlisted SMEs face soft disclosure rules, especially, relative to their asset and liability situation. In turn, companies with such characteristics have a costly access to outside finance which justifies a tendency to rely mostly on retained earnings and, residually, on bank credit and equity issue (see, for example, Joeveer, 2013; Brav, 2009; Coleman *et al.*, 2016). This type of financial structure is vulnerable to economic and financial shocks. Cash-flow financing and short-term debt tend to fluctuate over the cycle and this may negatively affect long-run investment projects, such as those in R&D, and amplify the variance of short term ones. At a macro level, the relevance of SMEs explains why these last two phenomena, respectively, tend to depress long-run growth and to amplify business cycle dynamics in most OECD economies (e.g., see Kushnir, Mirmulstein and Ramalho, 2010; OECD, 2018).

In 'Optimal financial contracts with unobservable Investments and cash flows', it is considered how the 'information opacity' of small businesses and their associated information asymmetries expose outside investors to as many risks. Among those which seem more relevant, it is highlighted a possible adverse selection on firms' initial capital and moral hazard both on their investments and on the release of information on their earnings. The main goal of this work is to derive the firms' financial structure and investment policy which minimize these risks and the associated agency costs of capital. These (second-best) efficient, financial policies are then confronted with those emerging from the empirical evidence. More precisely, it is argued that the type of information asymmetries considered rationalizes those financial decisions normally observed for SMEs. If intermediaries cannot perfectly assess firms' return to investment (i.e. they face *ex-post monitoring costs*), then the optimal contracts look like *standard debt* contracts, in which monitoring is activated only if the creditors do not repay their debt. A firm optimal financial structure is the one characterizing a limited liability company that finances investments through retained earnings and, residually, with outside (standard) debt contracts. Initial (certified) capital has the double role to serve as collateral, thereby reducing *moral* hazard, and to work as an effective screening devise against *adverse selection*. Although this financial structure is (second best) efficient, it does not eliminate agency costs. Thus, unless a firm has sufficient internal funds to finance investments, it will tend to underinvest with respect to an economy with no information asymmetries.

On a theoretical stand point, this contribution is also one in the field of optimal contracts. In particular, it extends a classical paper by Innes (1990), essentially, along three dimensions. The first is to allow investment projects to depend also on the agent internal capital. The second dimension consists in assuming that internal capital may be unobservable to creditors, due to the firm 'opacity' (for example, resulting from the difficulty of outside investors to disentangle the financial situation of a private company from the one of its owner, or from the possibility that the agent hides his company revenues). The third dimension is to allow for *costly state verification* and assume that intermediaries can verify company earnings only at some (monitoring) cost. Other contributions along this research line are, for example, Lewis and Sappington (2000), Povel and Raith (2004), Hellwig (2009).

KEYWORDS: small business; security design; asymmetric information; moral hazard; investment decisions; soft capital.

15.5 Insurance and compensation sustainability in telecommunications service

L. Mastroeni

Service Level Agreements (SLA) are typically employed by telecomm providers (e.g. cloud providers) to provide guarantees on the quality of their services to end customers. Those agreements, which form a contract or a contract like relationship between the parties, state the obligations imposed on the provider, through a set of service quality metrics and constraints to be met. The compliance of providers with those contractual or contractual-like commitments has to be monitored, and several tools have been proposed in the literature for that purpose or to act on the basis of monitoring results to reach for compliance. Any tool has to measure a set of parameters related to the quality of service and compare their values against SLAs' provisions. As for cloud, to take an example, the foremost among them is availability, defined roughly as the percentage of time that the cloud is available.

When a violation occurs, as in an outage, the obligations underwritten in SLAs may not be fulfilled. In that case, the provider is expected to pay penalties, if the contract so prescribes, to compensate its customers for the loss incurred. If violations take place on a wide scale, penalties and compensations may endanger the economic balance of the provider.

Providers should therefore protect itself against such an occurrence. It can basically act in two ways:

- reduce the risk due to unavailability periods;
- be indemnified against possible losses.

The first countermeasure is technical in nature. Reducing the probability of occurrence and/or the amount of damages calls for investments in the infrastructure and better management processes. The second countermeasure instead relies on buying an insurance policy, whereby the insurer takes on the risk of paying all claims by customers in return for the premium to be paid by the provider, which acts as the insured.

As for the insurance approach, a major problem in the definition of the right premium of an insurance policy. In our research closed formulas are provided through the expected utility paradigm to set the insurance premium under different outage models and QoS metrics.

KEYWORDS: cloud storage; insurance; compensation; refund; availability.

15.6 Mergers and acquisitions

O. Morresi

This research line is inspired by the interest for the effects of globalization on the market for corporate control. It analyses the differences between national and cross-border acquisitions, first having Italy as a country of origin and then Europe and the US. It focused both on the value created by these deals and on the origins of this value for small- and medium-sized firms.

It was found that Italian, European and US firms benefit on average from acquiring other firms abroad. For Italian buyers, the value created seems to be greater when the target country is advanced and has a low risk. For US bidders, it is greater when an emerging country is targeted, the target country's growth rate is higher, the method of payment is cash, and the target firm is bigger. For European firms, the market reaction is higher for cash deals and when the target country grows faster and is advanced.

Besides cross-border acquisitions, the research line investigates also mergers and acquisitions as a way of delisting a firm from the stock exchange. It was studied why a firm may decide to delist from the public market and the effects of this choice on firm value and performance. This research is in progress and its outcomes are so far included in a forthcoming book that contains an extensive literature review and empirical analysis.

Overall, this research stream has been very productive with several papers, conference presentations and two books. To be mentioned that are involved also Alberto Pezzi from Roma Tre University and Barbara Fidanza from Macerata University.

KEYWORDS: mergers and acquisitions; public market; cross-border acquisitions.

15.7 Capital structure decisions

O. Morresi

The strategy a firm follows to finance its investments is one of the most traditional and studied topics in corporate finance. This research focused on whether a firm's financing choices are affected by the type of ownership structure and particularly by the presence of a family controlling shareholder and management. The investigation relay on the large number of family-controlled firms in Italy, that allowed to perform several analyses. Family firms are normally more leveraged and adjust their leverage ratios more slowly than non-family counterparts. Part of this research work was to carried out by Alessia Naccarato, from Roma Tre University.

KEYWORDS: capital structure decisions; corporate finance; family-controlled firms.

15.8 Corporate governance

O. Morresi

Given the growing popularity of university rankings as an instrument to drive both the choices of firms when recruiting employees and those of students when selecting universities, this research aims to investigate whether Chief Executive Officers (CEOs) who graduated from more prestigious universities are more skilled in managing their firm that therefore exhibits improved market- and accounting-based performance. The results obtained do not offer a strong support to the assumption that graduating from highly ranked schools assures a successful firm management. The market seems to value more CEOs who have graduated from more prestigious schools in terms of higher market-based indicators. However, this result is only found on the 5-year period after CEO appointment. No significant evidence emerges from accounting performance. Current empirical evidence is quite mixed and mostly confirms the absence of a statistically significant link between the CEO's university and firm performance.

This research has required a hard work of collecting personal information about CEOs of the main European publicly traded companies. This activity has benefited from the collaboration of a graduate student who helped me both tapping into Roma Tre's Thomson Reuters database and elaborating collected data. This partnership continued after student's graduation and gave rise to a published paper.

Another research stream in the corporate governance section that has been raising interest is the effect of family ownership and management on a firm's performance, risk and capital structure. This research line focuses on the high incidence of family firms in Italy, their role on the Italian entrepreneurial structure and the lively debate on whether a family as a controlling shareholder or involved in the management team may benefit the firm or not. The Italian context provides a sound and reliable base for studying family firms and comparing their financial characteristics with those of non-family companies. Within this topic, it was studied whether a firm's market- and accounting-based performance is affected either by the presence of a family controlling shareholder or by the presence of family CEOs, directors or top managers. In addition, it was verified whether family control affects capital structure decisions. The results show that family-managed firms, but not family-owned companies, have a lower market-to-book ratio than non-family-managed ones. Moreover, it was published a book that tries to explain the pros and cons and the financial characteristics of family firms around the world.

Finally, the research line also aims to study the causes and effects of CEO turnover. It was investigated whether CEOs leave office in response to poor firm performance or whether their replacement is primarily due to 'natural' reasons such as retirement, illness, control change, etc. Again, the case study was Italy a this gave the opportunity to analyse the causes and consequences of CEO turnover in a context of concentrated ownership structures and family-managed firms. It was found that insufficient accounting-based performance (but not market-based performance) causes CEOs to resign but the sensitivity to performance is lower when the CEO position is held by a member of the controlling family.

KEYWORDS: corporate governance; CEO; family ownership and management on a firm's performance; investment risk; capital structure.

Chapter 16

Finance: bubbles and financial crises

16.1 Speculative bubbles, asset shortages and liquidity

G. Bloise

A speculative bubble occurs when an asset is traded at a price exceeding its fundamental, or intrinsic, value. Speculative bubbles are difficult to identify prospectively, because intrinsic values are not observable, and can only be conclusively recognized in retrospect once an unexpected drop in prices has occurred. When bubbles crash, this disrupts the financial system, depresses the economy and induces recessions. Before their bursting, speculative bubbles grow erratically and are impossible to predict from fundamentals. This process, however, is not necessarily irrational, because the optimism is confirmed by growing asset values and investors are compensated for the risk that the bubble might collapse by higher returns. The causes of bubbles remain disputed and different theories have been proposed. This line of research intends to explore the relationship between asset shortages, liquidity and speculative bubbles.

According to this view, speculative bubbles are means for the market to endogenously create liquidity in response to a shortage of assets, as recently advocated by Caballero (2006). Prime candidates for examples of bubbles due to a shortage of assets are the 1990s inflation of asset values in South East Asia, due to an endemic inability of emerging markets to supply enough assets for the liquidity needs of fast-growing economies, and the rise in US housing prices in the 2000s, which many have linked to the presence of a 'global savings glut'. As trustworthy assets become scarcer, the liquidity premium inflates their market value to compensate for the decline of their supply. In fact, such assets are approximately priced as the store of value in Samuelson (1959) or Bewley (1989): they are mostly held as a source of liquidity and are sold when insurance is needed against an adverse shock. The upward adjustment in their market prices reflects an increased scarcity of suitable stores of value, rather than the prospect

of higher future investment income. Persistent inflationary pressures of this sort might end up causing speculative bubbles.
KEYWORDS: general equilibrium; financial markets; speculative bubbles; asset shortages; liquidity.

16.2 Central banks and bubbles

F. Giuli

The relevance of asset bubbles in affecting the business cycle has been increasingly acknowledged in the economic literature, especially after the worldwide financial crisis that started at the end of the first decade of the new century. Yet, what is commonly known as the 'conventional' view, i.e., that monetary policy can prevent the formation of bubbles by properly controlling interest rates (or the money supply), has not been unanimously shared. Such a monetary policy, known as 'leaning against the wind', asks monetary authorities to possess a theory of bubble formation and to accurately predict the occurrence of asset bubbles driven by non-fundamental shocks, a requirement that does not seem easy to meet. This conventional policy may also call for a change in the inflation target regimes that flourished before the financial crisis, or a change in the targets. An alternative view, dating back to Bernanke and Gertler (1999 and 2001) and to the original discussion on the arguments of the Taylor rule, acknowledges the negative effect that asset prices can produce on the business cycle, but envisages little advantage in including asset prices in monetary policy rules.

The debate on the subject matter was recently heated by Galì's (2014) 'unconventional' results, and the associated policy suggestions. In his overlapping generations (OLG) model, where there exist a continuum of stable bubbly steady states and a continuum of unstable bubbly steady states, a strong response of the interest rate to bubble fluctuations may increase both asset price volatility and their bubble component. Monetary policy should accordingly take into account the stabilization of both aggregate demand and the bubble, and it may well be optimal in some instances to lower the interest rate in the face of a growing bubble. This clear-cut conclusion is not however widely shared by the flourishing literature on rational bubbles, where several recent contributions have reached contrasting results. As stressed by Hirano, Ikeda and Phan (2018), there remains wide room for analyses of the interactions of monetary policies and asset bubbles. In the face of this unsettled discussion, this research aims to contribute to the debate on the role of monetary policy in economies displaying equilibrium rational asset bubbles by building a simple model which allows us to simulate the effects on real macro-economic variables of different policy rules controlling nominal interest rates. The framework can generate stationary equilibria with rational asset bubbles of different types. In some of these equilibria, the presence of bubbly assets can increase the values of stationary capital and output, whereas in others it reduces them, and we determine three main channels through which the stationary value of the bubble (relative to GDP) can shift the economy in one of the two types of stationary equilibria. Numerical simulations have then been run to evaluate the dynamic behaviour of a bubbly economy in response to different monetary policy rules. The main conclusion is that, under credit frictions and sticky prices, a 'leaning against the wind' policy is desirable only if the reactions of the central bank to inflation and output deviations from their targets are small. If this is not the case, the central bank could run the risk of increasing bubble volatility and rapidly turn the expansionary shock into a recession. Finally, it was obtained a recessionary response of output and prices, coupled with an increase in the bubble value, following an exogenous increase in the nominal interest rate. These results are in line with the empirical findings documented by Galì and Gambetti (2015) for the US economy.

KEYWORDS: asset price bubbles; monetary policy; overlapping generations models; stabilization policies.

16.3 Corporate governance, financialisation and business cycles

G. Scarano

This research has been dealing with the connections between corporate governance, corporate savings and business cycles. Thus, it has been concerning both mainstream and heterodox contributions dealing with the effects of corporate governance and strategic behaviours on portfolio management and investment decisions in big corporations, seeking to determine how these effects might play a major role in producing growing liquidity holdings and financialisation. Furthermore, this research has been also dealing with heterodox theories that find stagnation to be a major result of the monopolistic nature of big corporations and their forms of competition.

The main objective has been to understand whether these models can explain the tendency to put growing shares of social surplus into speculative financial channels, thereby contributing to long-term real stagnation.

KEYWORDS: investment theory; corporate savings; liquidity holding; financialisation; stagnation.

16.4 Equilibrium and crisis in Marx's economic theory

G. Scarano

This research line is partly inserted in the recent international debate about Marx and Non-Equilibrium Economics. From this point of view, the project has been focusing on the attractor role played by labour value and the difference between this concept and that of the equilibrium point.

The principal objective has been to clarify, if indeed the concept of equilibrium exists in Marx, what kind of concept it is: a static one, as in the Walrasian tradition, or a dynamic one, like those of steady state or balanced growth. Marx's theory, indeed, ignores the concept of full employment of the production factors and deals only with dynamic processes that are purely cumulative even though often contradictory in their interaction with one another.

However, the research has also dealt with the reconstruction of Marx's dialectical view of economic and financial crises, showing that, according to Marx, financial crises are phenomenal symptoms of the accumulation of the typical contradictions of economic crises within developed credit systems, and usually they can only anticipate and amplify the economic

crisis effects. Moreover, Marx's analysis is shown as a very interesting explanation of the structural tendencies to financialisation and the role of the latter in opening the way to financial crises.

KEYWORDS: labour value; economic crisis; financial crisis; dialectics; Marxian economics.

Chapter 17

Finance: agent-based models

17.1 Agents based models in personal finance decisions

L. Mastroeni

Decisions concerning personal finance are taken by individuals on the basis of a variety of factors. The hypothesis of rationality is only one of them. According to the socio-finance perspective, when making a decision, investors may also act in a non-rational way. However, investors can benefit from financial advice to improve their investment process until the point of complete delegation on investment decisions. This research line considers the case in which the individual decisions in personal finance are taken not just on the basis of factual information (e.g., documents such as a company's official financial statements) but considering also the opinions of other individuals. A typical case of such an influence is the activity of financial forums on the Internet. It is proposed that agents-based models where the evolution of competences of each individual is determined by its interactions with other individuals. Besides, it is considered competences as multidimensional variables. An individual is typically competent to different degrees in different dimensions, e.g. business, technology, legislation, environment, rhetorical, and social dimensions.

KEYWORDS: agent-based modelling; decision making; socio-finance.

17.2 Agent-based modelling for cybersecurity strategies

L. Mastroeni

In cybersecurity both categories of stakeholders are coping to make strategic decisions. On one hand, in fact, hackers have to decide whom to hit, on the other, *victims* have to decide how to defend themselves by deciding how much to invest in security. In the global information ecosystem there is a very large number of attackers and potential victims.

Through this system, based on agents, it is possible to describe a variety of individual behaviours with the aim of observing if any collective behaviour emerges.
KEYWORDS: cybersecurity; agent-based models; investment.

17.3 Predicting financial market behaviour by social media analysis

L. Mastroeni, F. Benedetto

With the recently expansive development of social networks (e.g. Facebook, Twitter, etc.), huge users publish and exchange a variety of financial-related information with other users. Therefore, social network is an important approach to comprehend conformist mentality. Social mood or sentiment in social media predicates upward or downward movement of the financial markets. Twitter, one of the main social media platforms, has been identified as an influential factor to the financial market with multiple sources of empirical evidence among academic and professional publications. The emergence of top influencers and the occurrence of the disruptive events such as the 2013 Associated Press Hoax have raised alarm on the potential threat of social media influence to the stability of the financial markets. With the aim of extending the traditional notion of market efficiency and identify policy oriented variables, this research line will provide information about information flow and market dynamics by evidencing the fact that financial market movement is a manifestation of the market participants' beliefs and behaviours toward future outcomes, and the aggregate of the societal mood should present itself as a reliable predictor. Moreover, the investors who are harvesting this information for their daily trading decisions forms the robust linkage between the social mood and financial market asset price movement. The research aims at providing a potential solution to understand how the huge world of social media streams influences financial market sentiment, thus determining the variables that analytically describes the (minimal) economic skeleton of this (complex) model.
KEYWORDS: financial market behaviour; social media; influencers.

Chapter 18

Miscellanea economica

18.1 Dynamic programming methods for economics

G. Bloise

This line of research aims at developing the application of the mathematical theory of concave operators (Krasnosel'skii, 1964) to the determination of optimal intertemporal plans, efficient distributions and, in general, recursive contracts in dynamic settings. The theory of concave operators, in fact, can be used to establish existence and uniqueness of solutions to recursive maximization (or minimization) programs in cases in which the traditional method based on Banach contraction mapping fails. It also provides an efficient tool for the computation of such solutions. This alternative mathematical theory is relevant for at least two economic applications.

Recent research in macroeconomics and finance has experienced increasing interest for recursive preferences (Koopmans, 1960). Differently from the traditional paradigm based on discounted expected utility, recursive preferences allow for capturing a richer variety of attitudes with respect to intertemporal substitution and toward uncertainty. Without sacrificing analytical and empirical convenience, tractable forms of recursive preferences permit to study consumption and saving, portfolio choice, asset pricing and optimal allocations. Notwithstanding this growing interest, however, concomitant progress in the analytical methods has not occurred and a fully developed theory is still unavailable. The conventional approach (e.g., Stokey, Lucas and Prescott, 1989) is unsuitable because recursive utility fails to satisfy the mathematical conditions that are necessary for the application of those methods. The theory of concave operators offers a valid substitute under some conditions.

Dynamic programming methods can be naturally used to study optimal contracts in the presence of asymmetric information or moral hazard. An information asymmetry happens when one party involved in the transaction has more or better information than the other party. Moral hazard occurs when agents increase their exposure to risk because other parties bear the cost of those risks. The purpose of an efficient contract is to motivate agents to take appropriate actions on behalf of the principal. A tension exists because agents are motivated to act in their own interest, which is often contrary to the interest of their principal. Consistently, the principal devises the efficient contractual arrangements by solving a recursive maximization program and the solution ensures the provision of appropriate incentives to self-interested agents. In dynamic settings, conventional methods of dynamic programming fail due to the existence of such incentive constraints. The purpose of this research line is to elaborate alternative mathematical tools based on the theory of concave operators.

KEYWORDS: dynamic programming; recursive utility; Bellman operator; concave operator.

18.2 Sustainable debt in competitive markets

G. Bloise

According to the dominant doctrine (more notably, Bulow and Rogoff, 1989), when debt contracts are not secured by collateral or by legal sanctions that creditors can exercise against debtors upon default, borrowing is not sustainable in competitive markets: creditors will anticipate debtors' incentives to default on their contractual obligations and will provide no loans at all, so that the market will collapse. In the real world, however, unsecured debt tends to be repaid more often than the theory predicts. For instance, a definite feature of sovereign debt is that it is not backed by any collateral or by the seizure of the debtor's physical assets. Nevertheless, sovereign debt markets exist and, except during sporadic episodes of crisis, work orderly, allowing countries to sustain huge debts over long periods without defaulting. Unsecured debt is also a relevant fraction of households' and firms' liabilities. Why do borrowers repay loans absent a legal enforcement mechanism?

The enforcement of unsecured debt must rely on some implicit mechanism. The ability to borrow represents a precautionary reserve of liquidity, as borrowers can resort to debt when adverse events occur and retain a smooth path of consumption. Thus, default is costly because it tarnishes the borrower's reputation for repayment and prevents future access to the insurance opportunities permitted by debt contracts. This view was challenged by the influential paper of Bulow and Rogoff (1989): creditors' limited legal recourse and market anonymity still permit debtors to acquire some level of self-insurance upon default and, thus, reneging on debt obligations becomes profitable.

This line of research intends to provide a fresh analytical insight on the way reputation for repayment can account for unsecured debt in competitive markets in the presence of uninsurable risks. Some risks are uninsurable because, despite continuous innovation in financial and insurance markets, such markets remain incomplete due to the lack of perfect enforcing institutions or to the asymmetric information between agents. When markets are incomplete, the cost of self-insurance can be prohibitively high since contingent claims might not be tradable and, without issuing debt, insurance contracts can only be acquired at a higher cost. Therefore, the loss due to the increased cost for self-insurance might well exceed the gain from default due to saved repayments. Debt then may become a superior instrument and repayments might be implicitly enforced by the threat of losing borrowing privileges.

KEYWORDS: general equilibrium; debt; limited commitment; risk of default; inside money.

18.3 Bad loans dynamics and the dimension and variation through the cycle of fiscal multipliers: analyses based on FAVAR econometric methods

M. Causi

A line of research concerns the application of FAVAR econometric methods to macroeconomic analysis. It is normal in macro-econometrics to find variables jointly influenced by other variables. Factor models can help to solve this problem, capturing the main pervasive influences that can affect the estimation of the relations between the variables of interest. FAVAR methods are applied to Italian time series in two fields: the determinants of bad loans dynamics and the dimension and variation through the cycle of fiscal multipliers. To this research contributed also Andrea Baldini.

KEYWORDS: FAVAR econometric methods; bad loans dynamics; cycle of fiscal multipliers.

18.4 Macroeconomic equilibrium and nominal price rigidities under imperfect rationality

F. Giuli

In the last two decades, Tversky and Kahneman's (1992) Prospect Theory (PT) has been increasingly accepted as an effective and realistic description of economic behavior in risky situations (Barberis, 2013) and it has been extensively employed to tackle several microeconomic problems, usually cast in a partial equilibrium context, or even in single choice settings. In spite of the decades-long debate on the microfoundations of macroeconomics and of Akerlof's (2002) early intuitions, the gap between PT and macroeconomic general equilibrium models remains instead rather wide, even though some attempts have recently started to populate the literature. The common characteristic of these macroeconomic attempts is to focus on only one choice dimension in which PT may play a role, be it consumption, wealth allocation, or search behaviour in the labour market. While this was reasonable and useful in an initial modelling stage, it is at odds with Barberis and Huang's (2009) notion of imperfect rationality based on the concept of framing. According to this view, the same PT elements should in fact separately characterize all the choices which are made by an individual under risky circumstances. This observation motivates the aim to start overcoming the limitation of existing models by constructing a simple economy in which PT elements are included into different choice dimensions and by investigating the general equilibrium consequences of this more pervasive influence of behavioural elements on agents' decision processes.

KEYWORDS: prospect theory; behavioural economics; macroeconomic equilibrium.

18.5 Household risk sharing

S. Tedeschi

This project aims at deepening the knowledge of consumption insurance at household level by identifying and measuring mechanisms through which households cope with risk of income shocks, both between and within them. In particular, it aims to:

- Quantify, in a unified and consistent framework, risk sharing mechanisms that are normally analysed separately;
- Deepen the role of neglecting risk and time preferences heterogeneity on the measure of risk sharing;
- Go in to depth in the analysis of the intra-household smoothing channels;
- Assess between-households' heterogeneity in terms of risk sharing capacity along a number of dimensions such as the position of households in the wealth distribution, access to credit, preferences heterogeneity, and more.

KEYWORDS: risk sharing mechanisms; consumption insurance; intra-household smoothing channels; credits.

Chapter 19

Superior customer experiences

Designing superior customer experiences is the new imperative for any company aiming at differentiating and gaining sustainable competitive advantage. An increasing number of firms is investing in building strong engaging relationships with customers. The high interactive component of customer engagement requires customers to actively participate in creating offerings.

But how should companies design and manage engaging customer experiences able to develop long-term relationships with their customers? This is the main question addressed by the research projects here presented. Such a question is currently investigated both in hedonic industries such as bookstores, art exhibitions, and food, and more profit-oriented industries, by adopting different perspectives.

19.1 Engaging customer experiences

M. Addis

Customer experience is a key concept developed in consumer research. Scholars have studied consumption experiences via an intense debate about their definition, antecedents, and consequences – focusing on fantasies, feelings, and fun as drivers of hedonic value. At the beginning, these aspects were regarded as restricted to specific product categories such as films, visual arts, literature, and any other consumption activities in which emotions constitute the main drivers of their value. More recently, they have been recognized as common and widespread in most – if not all – product categories, where the entertainment factor has been widely and profitably adopted to explain all sorts of consumption phenomena. Thus, companies have to design superior customer experiences, able to engage customers.

Customer engagement is a multidimensional concept resulting from interactive co-creative relationships. The generation of customer engagement requires not only general relational strategies but also high levels of interactivity and co-creation in customer experiences, allowing customers to act as prosumers, and engage in free self-development, self-actualization, and self-expression. Despite the high relevance of this concept, it is still largely unknown. A clear definition of the concept and its differences with partially overlapping constructs such as immersion, absorption, happiness and well-being, its antecedents and consequences still need further investigation.

Similarly, finding operative tools to design superior customer experience is a key challenge for both scholars and managers. Customer journey maps promise great benefits in designing and enriching customer experience. Their use is still limited, however, because of the difficulties in gathering data and interpreting them properly.

KEYWORDS: customer engagement; brand management; customer experience; customer centricity.

19.2 Customer centricity and value co-creation

M. Addis

Customer centricity represents an evolution of one of the main constructs of marketing, namely market orientation. Nowadays, any company aiming at serving the market according to customers' needs should anticipate the trends, and should get as closer as possible to customers. This principle lies at the basis of customer centricity. However, despite the theory, designing effective procedures, developing the needed competences and attitude towards the customers are challenging tasks. Customer centricity is therefore the new approach supporting companies to put customers at the centre of their processes. Many features of a customer centric approach still need further investigation.

Towards that end, one of the main topics to deal with refers to the role of customer as prosumer, which is investigated by marketing and innovation scholars. The latter copiously encourage firms to offer customers the opportunity to express their creativity. Co-creation represents a powerful strategy to generate value with customers and partners, share skills and

knowledge in order to develop a competitive advantage. However, the mechanisms underlying value co-creation are still widely unknown.
KEYWORDS: customer experience; customer centricity; consumption interactions; consumers' preferences; value co-creation.

19.3 Cultural consumption & sustainable touristic business models
M. Addis, F. Mulazzi

Customer experience, customer centricity, happiness and engagement all share a high relevance in hedonic consumptions, such as ballet, art exhibition, museum, theatres, movie theatre, and so on. In those markets, the value generated in consumption interactions is typically more emotional than rational. In those contexts, consumers' participation and subjective play a major role in driving success.

Because of the recent widespread of hedonic value, understanding the consumers' preferences is a relevant and interesting topic even for players in other industries. Food, movies, arts, and theatres represent insightful consumptions worthwhile of studying. Indeed, these product categories offer excellent contribution to the understanding of consumers' attitude and behaviour.

Those benefits emerge as especially relevant for touristic destinations. Indeed, cultural heritage typically acts as attraction for individuals looking for memorable experiences, regardless their origin. However, in order to design engaging and memorable experiences players and policy makers must adopt the tourist's point of view. Towards that end, they firstly have to fully understand individual preferences, and then build sustainable business models accordingly. Such a process is especially relevant for geographical areas with diffused and fragmented heritage.
KEYWORDS: cultural consumption; sustainable touristic business models; customer experience; customer centricity; big data.

Chapter 20

Quantitative methods

20.1 Composite indicators, inequality, concordance, local concordance, concentration

S. Terzi

By composite indicator is generally meant indicators formed compiling individual indicators into a single index, on the basis of an underlying model of the multi-dimensional concept that is being measured.

A crucial point in the construction of composite indicators is the choice of endogenously or exogenously derived weights. For composite indicators based on latent multidimensional variables – such as Human Development or Competitiveness – structural equations models such as PLS – path models provide the most flexible framework.

A second issue is concerned with inequality: how to account for horizontal inequality when aggregating different dimensions of a composite indicator? When designing composite indicators attention is often focused on its multidimensionality and on aggregation across different dimensions. However, two other aspects need consideration: the distribution of each indicator within its dimension (*inequality*) and the joint distribution of individual achievements or – vice versa – of deprivations. The suggestion is to *correct* the composite indicator by means of indicators that take into account joint distribution of the single components *across* dimensions.

Along this line a more committing issue concerns association among the different components. This line of research has led to the definition of a local concordance function. Loosely speaking d variables are concordant if for a unit i (i =1, …, n) large values on some variables are associated with large values on all the others and conversely for another unit i' small values for some variables are associated with small values on all the others. Perhaps the most widely used coefficient of concordance between 3 or more distributions is Kendall's W. designed to assess the agreement between *d* raters.

For *d* variables and *n* units we take moves from a similar concept of concordance/agreement and rank all the observations. We then divide each of the *d* distributions in *slices* of *s* (for the sake of simplicity we assume $s \leq n/d$), consecutive ordered observations and assess local agreement by counting how many times one observation in the *r*-th *slice* of any of the *d* distributions also belongs to *r*-th *slice* of any of the others. The greater the number of overlaps between corresponding slices, the higher the *local* concordance between the *d* distributions. Vice-versa maximum disagreement is when the units belonging to the r-th slice of the h-th distribution do not belong to the same r-th slice of any of the other d-1 distributions. Thus if we count the number of units belonging to the union of the r-th slices we reach a minimum (s) in case of maximum concordance and a maximum (sd) in case of maximum disagreement. We define and plot a concordance curve by computing local concordance for each sliding window of s consecutive ranks/integers.

The concordance curve can have many uses. Apart from measuring concordance among different variables or different components of a composite indicator it can also be used to compare different rankings derived from different composite indicators.

But it could also – when computed for the head or for the tail of a multivariate distribution – be used to measure concentration or inequality. In fact, high concordance in the tail or in the head of the single component distributions of phenomena such as wellbeing or poverty or social vulnerability is equivalent to high concentration of assets (on one tail) or of deprivations (on the other tail). As for the areas of applications they have been mainly well-being and/or quality of life indicators.

KEYWORDS: composite indicators; concordance; concentration; inequality; local concordance; PLS path models; structural equations models.

20.2 Big Data for official statistics, forecasting and small area estimation

A. Naccarato

The increased availability of online information in recent years has aroused interest in the possibility of deriving indications for many kinds of phenomena. In the more specific economic and statistical context, numerous studies suggest the use of online search data to improve the forecasting and now casting of official economic indicators with a view to increasing the promptness of their circulation.

This research addresses a problem that is closely connected with the forecasts of official statistical indicators produced monthly by national departments of statistics in all the European countries based on data gathered through sample surveys. For all these indicators, it is useful to have forecasts that give some idea of the variations to be expected in the short term, not only because they can serve as preliminary estimates of the phenomenon examined but also because they can be incorporated into econometric models to provide indications of the prospects for the economic system as a whole. The Italian National Institute of Statistics (ISTAT) produces such forecasts by means of statistical models that make no use of information from external sources and rely only on the data provided by its own sample surveys.

Many scholars and researchers have become aware in recent years that the vast amount of information to be derived from the mass of online search data available could prove useful in the study of social phenomena (Askitas and Zimmermann, 2015; Chamberlin, 2010; Choi and Varian, 2012; Daas *et al.*, 2015; Einav and Levin, 2014; Guzman, 2011; Marchetti *et al.*, 2015). This is because the information that people disclose about their needs using the Internet (Ettredge *et al.*, 2005) can shed light on the variability of numerous phenomena under examination. A review of the application of these types of data in different fields can be found in Hassani and Silva (2015).

It is easy to state that the relevance and potential of this tool lies in their characteristic of containing a huge amount of information that is easily accessible yet difficult to obtain in another way. This represents a great opportunity especially for statistical purposes, and the interest of the scientific community is evident by the amount of work proposed in literature over the past 10 years. Only a few of the most recent studies are involved in small area estimation problems (Porter *et al.*, 2013; Rao and Molina, 2015) in the spread of infectious diseases (Anggraeni and Aristiani, 2017; Teng *et al.*, 2017), in numerous economic contexts such as consumer purchases (Schmidt and Vosen, 2013), housing market (Limnios and You, 2016), tourist inflows (Dinis *et al.*, 2017), forecasting energy (Hassani and Silva, 2016), credit developments (Burdeau and Knitzler, 2017), and social phenomena (Nghiem *et al.*, 2016; Nixon, 2016; Parker *et al.*, 2017).

In the official statistics field, some studies have been carried out to assess if online search data – in particular Google Trends data – can be used to facilitate the estimation of the phenomena of interest for the national statistical institutes or to produce additional information (Charles-Edwards, 2016; D'Alò *et al.*, 2015; Falorsi *et al.*, 2017; Kristoufek *et al.*, 2016, Naccarato *et al.*, 2017).

In this context, this research focuses on two aspects: the extraction of reliable information from Big Data sources, as well as its accuracy in terms of the quality of the statistical data; the use of Big Data information in models for forecasting, preliminary estimation and small area estimation for economic phenomena such as the unemployment rate and household consumption.

KEYWORDS: Big Data; Google trends; reliable information; quality of statistical data.

20.3 Spatial analysis of socio-economic phenomena

A. Naccarato

The study of spatial distribution constitutes an element of primary importance whenever the phenomenon of interest can be georeferenced. This holds all the more when the objective is the analysis of themes closely connected with populations of individuals that live in a specific area on a permanent basis and manifest their social and economic habits, behaviours and interactions between subgroups (Voss, 2007). In this perspective, the planning of the resources required by a population (in particular in terms of public services) cannot dispense with careful study of how it is distributed over the territory with reference to the socio-economic and demographic characteristics that define it.

The integration of spatial information into the context of social and economic studies is a process broadly developed in the literature of the last few decades (Goodchildand Janelle, 2010), not least due to the availability of computational processes capable of handling vast amounts of information and dedicated software for the mapping of spatial distribution.

Studying how a population is distributed over a territory can make it possible to define models for the allocation of resources in areas such as education (Elis-Wiliams, 1987) and health services (Lwasa, 2007) or for the planning and organization of economic resources in general (Linard *et al.*, 2012; Grimaccia and Naccarato, 2018; Benassi and Naccarato, 2016) in order to take into account how the socio-demographic characteristics of a population – which largely define the needs of individuals in terms of services – manifest themselves in the territory in question.

These studies are based on the idea that the spatial distribution of a phenomenon does not depend exclusively on topographical elements such as spatial proximity and/or Euclidean distance between individual locations, but also on other aspects lying outside the dimension strictly connected with spatial metrics (Anselin, 1995, 2003; Haining *et al.*, 2010; Naccarato, 2012; Benassi and Naccarato, 2017). It follows from this that the organization of services within a territory at the level of sub-regional areas must take into consideration not only the spatial proximity of the areas or the morphological characteristics of the territory, but also the socio-demographic characteristics of the population of the areas in question.

KEYWORDS: spatial distribution; spatial analysis of socio-economic phenomena; population distribution; planning and organization of economic resources.

20.4 Multiregional demography and Taylor's power law, methodological developments and applications

A. Naccarato

The dynamics of a system of interdependent human populations is the subject of a rather active branch of demography called multiregional demography. The focus of this discipline has always been on the study of the spatial distribution of human populations that occupy several territorial units belonging to the same system. The spatial and temporal variations of these populations, which can be regarded as subpopulations of the total population, are usually analysed by considering both births and deaths that occur in the individual territorial units within a certain time interval and the migrations between the territorial units and between these and other units located outside the system within a certain time interval (Rogers, 1975, 1995). The demographic events (births, deaths and migrations) of each subpopulation are reflected, net of territorial changes, in the spatio-temporal changes of the population density.

The population density is important not only in demography and human geography but also in many other scientific fields, such as biology, ecology and the natural sciences (Dey and Joshi, 2006; Gilpin and Hanski, 1999; Hanski, 1999). The ecologist Lionel Roy Taylor, studying the relationship between the variance and the average density of non-human populations (Taylor, 1961; Taylor, Woiwod and Perry, 1978), developed a formalization of this relationship, which later became known as Taylor's power law (Tpl) (Taylor *et al.*, 1983).

Taylor and colleagues revealed that in an animal population divided among a number of distinct territorial units, the variance of the population density in the territorial units is related to the average density in the same spatial units by means of a power law relationship.

Interest in the scientific debate about the origin and interpretation of Tpl is very great, with reference to both the meaning of the exponent (Cohen, 2013; Cohen, Xu and Schuster, 2013; Giometto, *et al.*, 2015; Ramsayer *et al.*, 2012) and the underlying mathematics (Cohen and Xu, 2015; Eisler, Bartos and Kertész, 2008; Fronczak and Fronczak, 2010; Kendal and Jørgensen, 2011; Kilpatrick and Ives, 2003).

As pointed out by Kendal (2004), this 'law' has found numerous applications in various fields of study such as biology, epidemiology and medicine (Anderson and May, 1988; Rhodes and Anderson, 1996; Philippe, 1999; Kendal, 2002; Kendal, 2003; Hanley *et al.*, 2014).

Quite surprisingly, however, as pointed out recently (Cohen, Xu and Brunborg, 2013), Tpl has found relatively few applications in the field of human demography and economics. Although the first application of the law to population data from the US Census of Population was made by Taylor *et al.* (1978), it is only recently that contributions have appeared in the field of population studies (Bohk, Rau and Cohen, 2015; Cohen, 2014; Cohen, Xu and Brunborg, 2013; Xu, Brunborg and Cohen, 2017, Benassi and Naccarato, 2018; Naccarato and Benassi, 2018). In the discussion and interpretation of the application, the TL slope (Cohen *et al.*, 2013) is crucially important. As Cohen *et al.* (2013) state: 'If TL is successful, it could offer a new empirical regularity in human demography and a useful empirically tested baseline or standard against which to evaluate population projections at varied spatial scales. In this case, TL could be added to the ensemble of demographic techniques and models (like the exponential model and age-structured population models) shared by demographers of human and non-human populations'. This research focuses on the study, through simulation, of the variability of the Tpl slope and on the possibility of building an index of homogeneity based on the variance estimated by this power law. Applications are also being developed to phenomena of an economic nature such as GDP and poverty levels that typically show phenomena of concentration at the territorial level.

KEYWORDS: multiregional demography; Taylor's power law; human demography and economics.

20.5 Optimizing the spectral resource allocation by auction-based methods

F. Benedetto, L. Mastroeni

The rapid growth in the demand for wireless broadband applications in both licensed and unlicensed frequency bands has led to an ever-increasing need for radio spectrum. As confirmed by several measurements about spectrum occupancy, the fixed policy adopted by Governments and regulatory Agencies concerning the assignment of the spectrum results in an under-utilization of its usage below 1GHz. This behaviour severely reduces the number of available (i.e., vacant) frequency bands viable to deploy new communication services or to enhance the existing ones. In addition, the continuous development of new technologies requires a more flexible and efficient management of the spectrum to satisfy the goals of the EU Digital Agenda and the future market demands for mobile and broadband services.

A new emerging technology, namely Cognitive Radio (CR), addresses the issue of spectrum scarcity and aims at improving the efficiency of the spectrum. CR-based devices are indeed able to gather information about the surrounding radio environment to dynamically adjust their operational parameters and improve their performance. In such a dynamic spectrum sharing scenario, unlicensed secondary users (SU) are allowed to utilize the radio spectrum owned by a primary owner (PO). For this purpose, designing a spectrum sharing mechanism that can efficiently allocate the spectrum bands to SUs, seems imperative. It is necessary for the mechanism to provide sufficient incentives for both PO and SUs to participate in spectrum sharing. In a simple spectrum auction scenario, the POs act as auctioneers and sell their idle spectrum bands to SUs to make a profit, and the SUs act as bidders who want to buy spectrum bands. In such a setting, auction-based mechanisms appear to be the most appropriate approach because they can capture many of the key features of the spectrum sharing problem: (*i*) it is possible to consider situations where the seller is not assumed to know any prior information about the valuation of items to the buyers; (*ii*) auctions can be designed to allocate items to the buyers with highest valuations, thus making an efficient allocation; (*iii*) auctions require minimum interactions between seller and buyers, because the buyers just need to submit their bids over the items.

This research aims at designing an efficient auction-based approach, so that radio resources such as subchannel, time slot, and transmit power can be optimally allocated among licensed and unlicensed users in the system, following market laws. Moreover, it focuses on providing, by the auction-based approach, smart tools to model and analyse the incentivized interactions among the primary and secondary users and therefore to analyse the economics of cognitive radio systems.

KEYWORDS: radio spectrum management; resource allocation; auction-based scenarios; cognitive radio technology.

20.6 Dynamic Spectrum Access in Cognitive Radio Communications: Spectrum Sensing, Spectrum Management, and Spectrum Security

F. Benedetto

Opening spectrum resources increases competition and business-drive to innovate and improve services. Spectrum sharing increases supply of services leading to decreased costs. Removing or decreasing obstacles in the spectrum use opens an opportunity to a larger number of potential investors and allows other systems to exploit under-utilized spectrum resources, thus increasing spectral efficiency. Moreover, resales rights of spectrum resources enable dynamic spectrum market. Conversely, multiple incompatible systems using the same resource waste more than one optimized system, leading to increased costs.

Grasping the possibility offered by policy-based dynamic spectrum access (DSA) permits to create modes of spectrum access that respond quickly to market conditions, allowing for continuous technology upgrades and enabling networks with finely tailored speeds, capacities and Qualities of Service (QoS). The full economic and social benefits of this digital transformation will only be achieved if National and International Standardization Bodies and Agencies can ensure widespread deployment and take-up of very high capacity networks, in rural as well as in urban areas. Since the telecoms sector today is an enabler for the entire digital economy and society, Nations need to act quickly to secure their future global competitiveness and prosperity.

This research aims at addressing the problem of spectrum scarcity by analysing and proposing: (*i*) novel signal processing techniques for the performance improvement of spectrum sensing in trusted and untrusted networks (i.e. without and with the presence of attackers); (*ii*) spectrum management approaches for efficiently implement spectrum sharing between allowed terminals (i.e. primary and secondary uses); (*iii*) novel methods literature to leverage social trust and social reciprocity, such as cooperative jamming and transmission based on exploiting both physical-layer and social-layer information.

KEYWORDS: software and cognitive radio communications; dynamic spectrum access; radio spectrum management; standardization activities.

20.7 Entropy-based Methods for Innovative Data Processing of Signals and Time Series

F. Benedetto

Entropy is a concept initially borrowed from the classical mechanics, and later from the information theory. In mechanics, the entropy is used to quantify the disorder and uncertainty of dynamical systems, or in other words, it is an expression of the randomness of a system. On the other hand, the entropy in information theory is considered as a measure of the information content of the series under investigation. In particular, the mathematician Claude Shannon has also related the concepts of entropy and uncertainty in his pivotal works. He finally argued that the information is a measure of the degree of uncertainty exercised by the source in the phase of selecting the message to transmit. The Shannon entropy equation provides a way to estimate the average minimum number of bits needed to encode a string of symbols (emitted by a source), based on the frequencies of the symbols. If one of the symbols is more probable than others, the observation (i.e., reception) of that symbol is less informative for the receiver. Conversely, rarer symbols provide more information when observed. Since the observation of less probable symbols occurs more rarely, the net effect is that the entropy (thought of as average information) received from non-uniformly distributed data is less than $\log_2(N)$, being N the number of symbols of the source. The entropy is zero when one outcome is certain.

In this research, the idea is to apply the concept of entropy to several fields, spanning from the analysis of time series in the financial market, to

the study of radar signals. In particular, we focus on devising: (*i*) novel signal processing techniques for application to financial engineering to assess the predictability of financial time series based on the maximum entropy method; (*ii*) entropy-based signal processing procedures, innovatively applied to radar signals in engineering (e.g. for the assessment and the health monitoring of road pavements and railway ballast conditions).
KEYWORDS: entropy-based methods; dynamical system uncertainty; financial signal processing; entropy-based-radar signal analysis.

20.8 Decision support systems for integrating evidence with applications in economics, law and forensics

J. Mortera

This interdisciplinary research builds on the interaction among statistics, forensic science, economics and computer science concerning applications of statistics, probabilistic expert systems and Bayesian methods. An aim of this research is the efficient implementation of statistical models and tools for the analysis of uncertainty inherent in complex structural systems. These are the backbone of both forensic statistics and quantitative problems in economics. Bayesian networks (BNs) and in particular Object oriented Bayesian networks (OOBNs) having inferences computed by probability propagation methods offer an appealing practical modelling framework and have been successfully applied to these complex problems.

A first problem concerns an economic decision problem where the actors are two firms and the Antitrust Authority whose main task is to monitor and prevent firms' potential anti-competitive behaviour and its effect on the market. The Antitrust Authority's decision process is modelled using a Bayesian network (BN) where both the relational structure and the parameters of the model are estimated from a dataset provided by the Authority itself. Firms strategies are modelled as a repeated prisoner's dilemma using object-oriented Bayesian networks. It is demonstrated how to BNs can integrate firms' decision process and external market information (Mortera, Vicard, Vergari, 2013).
KEYWORDS: decision support systems; Bayesian networks; object oriented

Bayesian networks.

20.9 Probabilistic expert systems for forensic identification using genetic markers

J. Mortera

This research concerns combining different items of evidence such as combining forensic quantitative evidence with logical evaluations from advocates, lawyers, public prosecutors and judges (Various Authors, 2018, *Statistics and probability for advocates: Understanding the use of statistical evidence in courts and tribunals*, Royal Statistical Society, Statistics and Law Section) and Inns of Court College of Advocacy (published on the RSS website and Mortera and Thompson, 2018, Novel Evidence).

The research also concerns the use of Bayesian models and Object-Oriented Bayesian networks for: statistical methods for DNA analysis, particularly in the difficult situations that arise in actual cases of forensic detection: mixed, low template or degraded DNA samples, relationship identification from DNA mixtures, sensitivity to assumptions; integrated decision support systems for combining evidence from DNA markers and non-genetic evidence.

Frequently, DNA samples found on crime scenes are complex, either because the amounts of DNA are tiny, even just a few molecules, the samples contain DNA from several individuals, the DNA molecules have degraded, or a combination of these. In such cases there is considerable uncertainty involved in determining whether or not the DNA of a given individual is actually present in the given sample. A robust model for identification and separation of complex DNA mixtures from several contributors based on discrete data (allelic presence) and on continuous peak height data has been developed. The computations exploit an efficient Bayesian network representation of the model. The allele frequencies are normally treated as fixed and known, although they too are parameters which should be estimated. In Green and Mortera (2009) we account for the inherent uncertainty that is associated with allele frequencies, incorporate kinship corrections and population heterogeneity.

Current research concerns the possibility that a DNA mixture includes contributions from several members of a family. This possibility will obviously affect the evidential value of the mixture. One can distinguish between populations with high relatedness, due to inbreeding and specific close relationships. The phenomenon is the same in both cases, but they require different modelling approaches. The general setting is to encode the joint distribution of the genotypes of specified individuals in a pedigree, in a form amenable to computational inference based on peak heights in a DNA mixture with these individuals as contributors. When this inference is to be implemented using Bayes nets, a natural approach is to model the pedigree directly in a graphical model. In cases of disputed inheritance, when the DNA is taken from a body part, it is degraded and contaminated and can appear to be a mixture of several individuals. The idea is to develop a methodology to compute the likelihood ratio for paternity, and other relationships that takes all the uncertainty into account. The analysis of DNA mixtures with hypotheses on familial relationships, is also useful for identifying disaster victims. Publicly available software *Kinmix* has been developed to solve these problems.

KEYWORDS: probabilistic expert systems; forensic quantitative evidence; DNA; genetic markers.

20.10 Decision support systems for integrating information from various sources

J. Mortera

Bayesian methods and Bayesian networks have the potential to solve problems in several of the topics outlined above. Thanks to their modularity, flexibility and computational efficiency, they allow for a clear representation of structurally complex problems as presented here. It enables one to visualise and model dependencies between multiple hypotheses and pieces of evidence and to calculate the revised probability beliefs about all uncertain factors when any piece of new evidence is presented. BNs have been used for the analysis of DNA evidence specifically, but have also recently been applied to support much broader.

20.11 Analysis of complex dependence structures via Bayesian networks: theory and applications

P. Vicard

The focus of the research is the analysis of complex dependence structures. Many real phenomena are characterized by high complexity due to a large number of variables of interest. In such a case it can be interesting to study the relationships among the variables in order to estimate the underlying generating process. In this research graphical models, and, in particular, Bayesian networks are used. These are multivariate statistical models able to represent the conditional independence statements entailed by a directed acyclic graph (DAG). A DAG is a pair G = (V; E) where V is the set of nodes and E is the set of directed edges between pairs of nodes. Each node represents a random variable, while missing arrows between nodes imply (conditional) independence between the corresponding variables. A directed graph is acyclic in the sense that it is forbidden to start from a node and, following arrows directions, go back to the starting node. Given that BNs are conditional independence models, they allow to describe and to read independencies from the DAG.

Structural learning is a complex task when it has to be performed from a data base. In standard Bayesian networks analysis, several algorithms have been proposed to learn the structure when data are independent and identically distributed (*i.i.d.*), and when variables are either discrete or continuous or mixed discrete and continuous, assuming the normal distribution when all variables are continuous and the conditional Gaussian (CG) distribution when the variables are discrete and continuous. In case the continuous variables are non-Gaussian, it is standard practice to discretize data. In such a way, the network can be learned (estimated) but, in turn, there is information loss. A recent solution is given by the use of copula models giving rise to non-parametric Bayesian networks (NPBN). Differently from standard BNs, in continuous NPBNs nodes are associated with continuous invertible distribution functions and edges with (conditional) rank correlations that are realized by a chosen copula. This research aims at developing novel structural learning algorithms for

NPBNs. In a first phase, the Gaussian copula is used since it preserves the condition that a zero rank correlation between two variables implies the absence of an edge between the nodes associated to those variables in the graph. In a second phase it will be necessary to remove the assumption of Gaussian copula.

There are several application contexts that are being analysed:

- energy production using data given by Enel on the commodities, their price, energy demand. The goal is to estimate the association structure among the variables of interest in order to take decisions about the production level of the various energy types according the demand and the availability of energy from renewable sources. In such a context, variables are non-Gaussian and NPBNs are necessary.
- measurement error problems. In particular, data from the Survey on Household Income and Wealth (SHIW) conducted by Banca d'Italia are considered. The aim is to detect and correct errors in the main financial variables (such as amount of bonds owned by households). Also in such situation, the variables are non-Gaussian and therefore NPBNs are used. In this case, an error detection method based on insertion and propagation of evidence throughout the network must be used. Moreover, a correction algorithm has to be developed in order to automatically correct all the data set records by sampling from the conditional distribution obtained in the detection phase. Note that measurement error modelling and correction is also an official statistics problem.

Another context of interest is that of official statistics. In this case the problem is complex also due to the large amount of data and to the fact that data are generally collected according to complex sampling designs, therefore they are not *i.i.d.*. In this last case, the standard structural learning algorithms cannot be used. In the research, attention is focused on one of the most used algorithms: the PC algorithm. It estimates the network by using independence and conditional independence chi-squared type tests. The idea is to take into account the design complexity at the test level so that consequently the structure can be learned without systematic bias.

A very important feature of BNs is that they can be associated with an inferential engine able to propagate evidence and to update the probability distributions associated to the nodes in real time. This means that BNs constitute a decision support system helping decision makers to evaluate scenarios in rea time. In fact, *what-if* analysis can be carried out by instantiating the nodes with evidence (that is, for example, a managerial decision, an improvement action, an energy production policy etc…) and then propagating it in order to obtain the updated distribution of the main response variable(s). Hence, the impact of a possible action can be very easily read from the Bayesian network. This can be done for various scenarios, whose different consequences can be quickly evaluated and compared.

Several applications of BNs to real contexts are carried out. The main applications regard: quality management, customer satisfaction, energy economics (as said before), data quality management.

KEYWORDS: Bayesian methods; Bayesian networks; evidence combination and evaluation; DNA.

20.12 Model selection and model uncertainty with applications in Health Economics

C. Conigliani

Model selection is the task of selecting a statistical model from a set of candidate models given data, and is an important part of any statistical analysis. It includes for instance variable selection for linear regression, the selection of the number of components in a mixture model, the selection of the most appropriate parametric family among a number of alternatives. And an improper choice of model or method can lead to severely misleading conclusions and disappointing predictive performances. In this context, my research activity focuses on different aspects, with emphasis to both methodological aspects and applications, and a key role is held by Bayesian model comparison, with particular attention devoted to situations with weak prior information and alternative Bayes factors.

A topic related to Bayesian model comparison that has interesting applications in Health Economics is Bayesian model averaging (BMA). Under this approach, instead of choosing a single parametric model for a data set, one can specify a set of plausible models and estimate a mean parameter with a weighted mean of its posterior expectations under each model. It was applied BMA for the particular problem of assessing new and existing technologies for their cost-effectiveness, that are usually characterized by highly skew and heavy-tailed distributions for costs, so that it can be extremely difficult to produce realistic probabilistic models for the underlying population distribution. And besides considering the standard assumption of proper prior distributions for the parameters under the different models, it was proposed a new method that allows to apply BMA with improper priors. At present we are working on the possibility to apply BMA in this setting assuming models with different parameter dimensionalities, which makes it more difficult to assign and interpret the prior model probabilities.

For the same problem of modelling costs in cost-effectiveness analyses, it was also explored the behaviour of a semi-parametric model composed of a piecewise constant density up to an unknown endpoint, and a generalised Pareto distribution for the remaining tail. The result is a very flexible model able to fit data sets with very different shapes both in the bulk of the data and in the tail. At present we are considering the possibility of extending this model in situations where covariate adjustment is needed, that is not straightforward when the number of steps of the step function is not fixed, as in our case.

Another topic that was considered within the Bayesian framework and again with applications in Health Economics is mapping between the Short Form Health Survey (SF-12) and the EQ-5D, which are two commonly employed patient-reported outcomes measures that are used extensively in health services research. In fact, the EQ-5D is fundamental for obtaining an estimate of the quality-adjusted life years for the responder, that is the cornerstone of cost-effectiveness. However not all studies include EQ-5D, although the vast majority will have collected one or more instruments such as SF-12, that cannot be used directly to derive quality-adjusted life years. Then one solution is to map changes in SF-12 to changes in EQ-5D, but the choice of mapping methods is likely to have a direct effect on the results of an economic evaluation model. This research's approach is based on multivariate ordered probit regression, that takes into account both the dependence between each of the five dimensions of the EQ-5D questionnaire (mobility, self-care, usual activity, pain or discomfort, and anxiety or depression) and the ordinal nature of the levels of severity (no problem, some problems and extreme problems) in each of the five dimensions. One aspect that we are still dealing with is that of choosing an appropriate summary measure of agreement between predicted and actual results when developing mapping functions, with particular attention devoted to scoring rules. This is a relevant question related to the difference between selecting a model that explains the data well and selecting a model that gives the best predictions.

KEYWORDS: model selection; weak prior information; Bayesian model averaging; multivariate ordered probit regression.

20.13 Model selection with applications in environmental economics

F. Cappelli, C. Conigliani, V. Costantini, E. Paglialunga, G. Sforna

A different topic under investigation within the framework of model selection is that of modeling count panel data taking into account spatial interactions at the geographical scale. In particular, we are interested in developing a spatial panel model that links armed conflicts to climate change in Africa.

Notice that, given the nature of the database originally built within the research activities of the Department, i.e. the fact that the data are relative to adjacent spatial units located in an unbroken area (so that each unit represents itself), we find appropriate to focus on fixed effects models rather than random effects ones.

Moreover, in order to take into account both over dispersion and an excess number of zeros, we mainly concentrate on zero-inflated negative binomial models. Formally, this implies considering a two-component mixture model combining a point mass at zero with a negative binomial distribution; thus, zero counts may come from both the point mass and from the count component, and a binary model (potentially containing regressors that might or might not coincide with those included in the count regression model) is used for modelling which of the two processes the zero outcome is associated with.

Finally notice that, with respect to the normal setting, when modeling count data, it is not straightforward to take into account all possible types of interaction effects that can explain why an observation at a specific location may depend on observations at other locations. Including for instance interaction effects among the error term, that represent a situation where the determinants of the response variable omitted from the model are spatially auto correlated, is made difficult by the fact that the specification for the conditional mean in a count regression model does not contain a random error term. Similarly, the introduction of endogenous interaction effects, that represent a situation where the response variable of a particular unit depends on the response variable of neighbouring units, is quite controversial in classical count data models, the reason being that there is no direct functional relationship between the regressors and the dependent variable (but rather a relationship between the regressors and the conditional expectation of the response). Instead, the introduction of exogenous interaction effects, that represent a situation where the response variable of a particular unit depends on explanatory variables of neighbouring units, raises no particular issues in count data models: spatially lagged or otherwise spatial regressors can be computed before the actual regression is performed and be treated the same way as the non-spatial ones.
KEYWORDS: model selection; zero-inflated negative binomial regression; spatial econometrics for count data.

20.14 Mathematical models for economic and financial applications
V. Guizzi

The research activity develops in the field of mathematics and mathematics for economic and financial applications. The most recent research interests are, on the one hand, in the economic and financial applications of optimal control theory and, on the other hand, in the use of dynamic optimization for the study of risk problems in energy markets.

The theory of optimal control is central to the study of many economic and financial phenomena described through dynamic models when the objective is to make a choice. The criterion of choice is expressed through the optimization of an intertemporal functional under constraints of different type. The interest is directed to the problem of maximizing consumer utility in continuous time and with a finite time horizon, both in the deterministic and stochastic case and also in the presence of partial information with methods of dynamic programming.

A less recent line of research is that of the study of problems of selection of a financial portfolio or of the problem choosing an optimal portfolio for an investor with a constraint given by a fixed minimum return threshold (shortfall). This approach makes use of the concept of shortfall risk, which only takes into account downward variations in financial returns with respect to the fixed minimum threshold.

Problems of representation theory of groups and algebras have also been previously studied. In particular, the irreducible and unitary representations of the quantum group associated with a symmetric pair have been classified. Still in the field of representation theory, a combinatorial construction of the irreducible representations of the symmetric group (in collaboration with P. Papi) and of affine Hecke algebra of the general linear group of parameter q was provided (in collaboration with P. Papi and M. Nazarov).

KEYWORDS: optimal control; utility maximization; optimal growth; portfolio selection.

Chapter 21

Legal themes: interferences between Law and Economics

The departmental research proposed by the Legal Area (Area CUN 12) aspires to propose itself as a unitary one, moving and drawing strength, in particular, from a determined historical and positive position of the juridical and economic sciences in the social sciences; that is of those disciplines that are looking for strategies and pursuing functional goals for the construction of a society that is able to achieve those goals of solidarity and well-being and even before equality and democracy to which all the modern Constitutions are inspired. In the field of social sciences Law and Economics allow us to identify two important passages. Economy essentially pursues the aim of the best allocation and distribution of resources, it indicates and structures the production process and market relations. Law works so that this allocation and this distribution of resources, the productive settlements and the relationships between economic subjects, do not take place and do not only follow standard of efficiency but also criteria of allocative and distributive justice, mandatory rules to economic policy guidelines. Authoritative jurists of the calibre of Tullio Ascarelli and Giuseppe Capograssi have dealt with these issues.

21.1 Market and contracts: for a new statute of the traditional party autonomy – The importance of a procompetitive interpretation of private law

F. Macioce, F. Longobucco

Concerning Private Law, we can immediately think of the contract. Perhaps the general value of the traditional contract as a general tool at the service of many disciplines (admirably indicated in the past and which still represents an important historical passage) is now destined to assume various aspects depending on the concrete economic relations and subjects that take part to the agreement. Indeed, when the contract loses the exclusivity of the formal private dimension, economic reason is already part of the legal rule (just think of the case of collective labor contracts, but also of the relationship between public interest and administrative discretion). The contract between private parties, as the last stronghold of private autonomy (where the choices of a few and many are not so far from being indifferent from a socio-economic point of view) is different; it is still resistant to integrative or interpretative techniques. The individual contract is perhaps today the occasion for searching for new rules in order to combine respect for party autonomy and the participation to the legal system, the guarantees offered by law, the risk control, the equalization of solutions and rules as a tool for the reasonable composition of interests. Thus the economic justice of a case is the justice of everyone and presupposition of a society capable of satisfying growing and widespread needs. The challenge would be to search for an alternative way to the prospect inaugurated, but perhaps limited, of the c.d. EAL (economic analysis of law). A fertile ground is also the one concerning the role of the Regulatory Authorities and in particular of their rules which increasingly incorporate into the private law contract: in this regard, the most fruitful perspective seems to be that directed not so much at investigating the nature of the decision and its effectiveness (it has already been partially done), but at breaking down the formative process of the decision, identifying the components that contribute to the construction of the rule (and, in this regard, good results could be obtained from a deepened examination of the precious material constituted by the decisions of the various Authorities).

In the context of a modern civil law of the economy, increasingly hetero-regulated and less self-administered, the economic analysis of law must therefore be filtered in light of the platform of values on which our Constitutional order is based. In this context, it is useful to inspect the interests and functions of the traditional concepts of Private Law, as obligations and contracts, remedies and civil liability, guarantees, environmental and energy contacts.

Particular attention must be focused on the anti-monopoly law and on the pro-competitive interpretation of Private Law, as well as the effects

of the recent liberalizations on the contract itself. All this on the assumption that market constitutes nothing more than a normative statute, where the *regula iuris* guarantees the efficiency and justice of the system, the macro-micro planning, the concrete administration of the interests and negotiation dynamics. It becomes a fundamental topic the opportunity of a pro-competitive interpretation of Private Law through an inter-disciplinary analysis of Competition Law with Contract Law. That in order to demonstrate the traditional Civil Law might be differently considered and interpreted in the specific market where contractual obligation arises. Under this point of view, for example, it is necessary to adopt a new approach to the traditional notion of legal 'consideration' of the contract, to the ancient rule '*in pari causa turpitudinis melior est condicio possidentis*', to the doctrinal category of 'protection obligations' (*Schutzp-flichten*). All these institutions of Private Law show a full regulatory efficiency in the perspective of Antitrust Law, so that studying nowadays Contract Law requires the interpreter to value both the single contract and the whole complex environment of market where each single contract is made. The final aim of this suggested method is to make Economy and Freedom of Contract more consonant with the value of Human Person.
KEYWORDS: private law; contract; economic analysis of law; modern civil law; anti-monopoly law; pro-competitive interpretation of private law; regulatory efficiency; antitrust law.

21.2 Ecological contract and green economy

F. Longobucco

Private Law has a privileged eye on the Environmental Law, as the Private Law is a set of old instruments which must be bent to create new functions and therefore must evolve (this phenomenon is the so-called '*heterogenesis of the purposes*' of the rules contained in our Civil Code). Paradigmatic is the case of illegal discharges (cf. art. 844 C.C.).

Thus it is useful to underline the importance of creating a framework of method to be followed in the analysis of the institutes, for those who want to cooperate in the development of Environmental Law also on the civil point of view.

Under this point of view, for example, the Environmental Law impacts today's theory of property. Is the environment a classical good? It is a particular good without an owner, so that the traditional notion of property in the classical sense in no more available, while a potential ownership emerges [that, for example, of the future generations (*in incertam personas*)], the physicality of the traditional goods is outdated in our case, validating the idea that today goods must be considered more as *interests* than as *res* just as the ancients Romans meant.

The Environmental Law also impacts with the same notion of the modern contract and the negotiating activity. It becomes, for scholars, the test bench on which to sample what, by my cultural conviction, is the current crisis of the classical dichotomy between private interest and public interest, between proprietary interest and non-pecuniary interests (cf. art. 1174 C.C.). If we assume that the freedom of contract is no more a *dogma* and that it is instead today increasingly a synthesis of the autonomy of the parties and the heteronomy of the legislator (as autonomy of parties is no more an uncontrolled and uncontrollable power), then, the fundamental right to a healthy environment, to be realized in a pro-active way, becomes one of the limits (internal or external is a little matter) to the traditional freedom of contract. Perhaps manuals of Italian Private Law should be updated when we talk about the traditional limits to the autonomy of parties, as, in the Legal Public Italian and European order, the interest in a healthy environment, according to the ultimate protection of the person, must be certainly inserted. The interest in a healthy environment characterizes the inner '*causa*' (consideration) of the legal acts between private individuals and between private and public administrations [think, for example, of all the interesting matter of the '*appalti verdi*' (green public contracts) or the 'CAM clauses' to be entered in the public contracts].

Here comes the paradigm of the '*ecologically conformed contract*' in the new scenario of the Green Economy. This paradigm finds its base in the Art. 3 *quarter* of the Environmental Consolidated Law (the Italian 'Testo Unico Ambientale'), according to which every legally relevant human activity (under the Code) must comply with the principle of sustainable development, in order to ensure that satisfaction of the needs of current generations cannot compromise the quality of life and the possibilities of future generations. Also the activity of the public administration must be aimed at allowing the best possible implementation of the principle of sustainable development, for which, in the context of the discretional comparative choice between the public and the private interests, interests to protect the environment and the cultural heritage must be object of a priority consideration.

And what about the Italian Constitution? Already the Art. 9 of the Italian Constitution (about the landscape protection) indirectly protects the interest in a healthy environment, according to the best public scholars. Then it comes into evidence the Art. 41, para 2, of the Italian Constitution (with its limits to the autonomy of parties of the safety, freedom, public utility). Thus it is not true that the protection of the environment does not exist in our Constitution, rather it exists – albeit indirectly – also considering that the Constitutional norms are directly applicable to the activity of the private parties. All of this with the implication on the level of applicable civil remedies: it is not surprising if the violation of the principle of sustainable development, as a principle of legal public order, could lead, as some scholars have claimed, to the nullity of the contract according to the Art. 1421 C.C. which can be lodged *ex officio*.

How then does the traditional freedom of contract could be ecologically conformed? Certainly it could be conformed through the Italian and European general fundamental Principles: think, for example, of the principle of prevention, precaution, sustainability, energy efficiency, 'horizontal' subsidiarity according to the Art. 118 of the Italian Constitution.

Then the ordinary rules and the subsidiary rules come to evidence with the possibility of a wide expansion of a Regional Private Law, specific for the territory, that could also conform the contractual activity.

Yet think of the hetero-introduced rules in the contractual activity (Art. 1374 C.C.): consider, for example, the various rules by the Italian Regulatory Authority for Energy and Gas which, in the context of the general phenomenon of the regulatory 'hetero-integration' of the contract, create a whole of secondary rules (those on the price, for example) in order to conform the autonomy of parties. Think also of the 'autopoietic rules' (a sort of best practices that the companies themselves have to take) which also conform the contractual regulation.

In this way the traditional freedom of contract becomes more consistent with the environmental interest. And it doesn't matter if it's the fifth or the sixth model of contract: the first contract of the Civil Code, then we have the labor contract, then the consumer contract, then the contract between companies, now the ecologically conformed contract. A sixth contract.

And what about the function of this new model of contract, that is the ecologically oriented contract? We can surely think of a preventive function, of a compensation function, of a punitive function, but also of an 'heuristic and promotional' function, as suggested by some scholars, which is to say a stimulus to develop the interpretative and applicative attitude of the Italian jurists in setting point of a paradigm (the model of the ecologically oriented contract) which, although not specifically regulated, can certainly be legitimized in the Italian and European legal system.

KEYWORDS: ecological contract; environmental law; private law; Testo Unico Ambientale; civil code; green economy.

21.3 Work regulation and technological transformations

S. Ciucciovino

(i) The first aspect of the investigation concerns the possible use of new technologies in organizing and reforming active labor policies.

In this context, in fact, the cd. blockchain, or rather the process by which it is possible to create, among the public institutions involved, a computerized sharing of crucial information concerning the worker, could turn out a crucial factor in strengthening our labor market and a way of implementing the united information backbone of the labour policies. The main hubs of the research are the following: identifying the institutional entities that should be involved according to the purposes and functions that are called to fulfil; select the data and information regarding the worker to be collectivized in order to find the best possible employment in the given context, in accordance with the privacy legislation; increase the degree of general employability; optimize the use of resources and economic facilities linked to the state of unemployment or unemployment.

(ii) A second approach to the topic concerns the techniques of regulation of technological progress in order to correct distortive dynamics in terms of labor protection. In this direction, the aim of the research is to propose new tools to protect the worker to face the fourth industrial revolution in a different way from the past, but still aimed at ensuring a fair and effective protection. Particularly, the study's attempt is to overcome the classic criterion of imputation of labor protection based on the subordination/autonomy dichotomy to grasp, instead, the complexity of the organizational forms of work and the continuous evolution of new ways of working.

This analysis profile opens a special focus on the workers of the c.d. gig economy, in relation to which it is necessary to reflect not only simplistically on which protections to extend, but above all on how to articulate them effectively. The basic objective is to propose a holistic revision of the criteria for the access to the work protections and to radically revise the general techniques of protection of the work, foreseeing a common hoof of basic safeguards, invariants and independent from the legal form with which the performance of the work is made. This minimal common denominator should be accompanied by a system of progressive growth of protections, to scale up, based on the concrete weakness of the workers to whom applying protections commensurate with the protection needs. This is a proposal for change that finds the centrality of the person/worker as a crucial factor in the development of labor policies: in this perspective, the wealth of skills acquired and the ability to renew them from time to time becomes the best form of guaranteeing occupational continuity and professional and work growth.

(iii) A further in-depth profile concerns more closely the plan for the protection of the person/worker from potentially pervasive and perpetual controls implemented by the employer. In other words, it is a question of verifying how the new technologies, in allowing a wide management of personal data concerning the work activity, can impact on the most sensitive sphere of the worker, that is dignity and freedom of thought. It is a classic subject of labour law, which however requires a substantial revision in the light of both the recent choice by the legislator to reformulate the norm of the art. 4 of the Workers' Statute and of the growing importance assumed by the Privacy Authority which controls the new technological control methods, in addition to the judicial authority. The purpose of this line of research is to identify a new model of reconciliation between the right to privacy of the worker and the exercise of employer power.

(iv) The system of industrial relations cannot remain impermeable to the changes brought about by new technologies, where these relations inevitably affect the processes of formation and redefinition of the negotiating power between the employer and the trade unions. On this front the points of interference that are deepening are various and move from the reorganization of the work rhythms, often dictated by the machines and from the needs of efficiency of the productive systems, to the delicate question of employer fragmentation up to the dematerialization of the employer part, as in the case of computer platforms. In these dynamics, the role of the unions and the bargaining models, as well as the redefinition of the merchandise sectors itself, takes on a renewed and once again crucial role for the balanced development of industrial relations.

(v) Furthermore, a research project of European and transnational interest is underway which aims to compare the legal systems of Italy, Germany, France, Spain and Poland on new technologies and social citizenship with a specific focus on the web workers, as a category of very vulnerable workers with reference to the enjoyment of social rights and social protection.

KEYWORDS: organizing and reforming active labour policies; regulation of technological progress; labour law; social citizenship; web workers; social rights; social protection.

21.4 Economic choices and Constitution

M. Atripaldi, E. Marotta

Also in the Public Law area the solicitations to identify a correct relationship between law and economy are highlighted. The awareness emerges that there is no economic choice that can disregard legal regulation and at the same time that there is no human action that is not economically relevant. In other words, the fundamental idea is that Law and Economy cannot be considered as two units closed in themselves and opposed. Law conditions the economic processes that in turn condition the institutional frameworks themselves, determining a constant and living relationship.

We have instances that are attributable not only to jurists but also to economists. Thus we can recall the contributions of Tullio Ascarelli, Giuseppe Capograssi, Giuseppe Guarino, Luigi Mengoni, but also, among others, of Adam Smith and in particular of Federico Caffè who, in soliciting the encounter between law and economics, considers this same encounter as one of the possible ways to bring to life the 'dialogue between facts and theory' that has represented 'a trait, characteristic, constant of economic thought from F. Ferrara to L. Einaudi'.

In this context, the question that every juridical reflection must ask could be aimed at identifying the role that economic theories have played on the Legislator's choices.

One of the perspectives that need to be actualized in the Public Law area, and in particular in the Constitutional one, should be aimed at verifying the contribution that economic theories have played in the choice of the Economic Constitution present in the Constitutional Charter of '48. It would be more appropriate to identify the panorama of economic models taken into consideration by the Constituent in order to search for the intersections and interactions between the economic and the political. This analysis should be conducted in a scientific laboratory that does not aim to achieve the 'usual comparison between scholars of different social disciplines held over the time span of a conference, but the fruit of an analytical work set up completely and carried out with considerable coordination effort' (N. Acocella).

Nowadays it is argued that the economic models that were known to the economists who carried out their work in the offices set up by the Ministry of the Constituent Assembly and in the Constituent Assembly are those outlined by the traditional economic theory, elaborated in a pre-keynesian phase by the classical school and the neoclassical school. It should instead be verified if some physiognomic data of the keynesian model would have been acquired in the choices of the Constituent

Assembly. This kind of analysis was, for example, addressed in order to determine the choices of the German Legislator in relation to the incentive-saving policies. On that occasion it was shown that the solutions adopted were determined by the founding features of the Social Market Economy. However, we are in front of an investigation that will completely have to be conducted on the basis of the indications offered by the theory of institutions as indicated by the doctrine like the way for the interpretation of institutional dynamics.
KEYWORDS: Italian Constitution; Constituent Assembly; social market economy; Keynesian model.

21.5 The role of Public Economic Law on a modern theory of party autonomy and public organizations

P. Lazzara

This research activity is framed in the juridical questions that pertain to the relationship between public institutions, private autonomy and market. The study of public contracts should be declined in the perspective of the State-market dialectic, with attention to the profiles of the protection of competition. The analysis should be dedicated in particular to the choice of procedures and the object of the contract, to the preliminary market consultations and to the principles relating to the awarding of public contracts. The subject of public contracts should be also analysed through the regulatory function, focusing on the powers, the competences of the supervisory authority of public contracts and the practice of regulatory activity, in the perspective of the relationship between powers-freedom-autonomies.

The attention to different forms of public intervention in the economy more generally characterizes the study of the regulation of the public administration, conducted in the light of the authority-freedom dichotomy, through an analysis that takes as a constant reference the complexity of the relationship between freedom private economic and general interests. The activity and the powers of the Independent Administrative Authorities are references and subject to analysis within the various study topics. The most recent research in fact involves the powers of the Antitrust Authority (pursuant to the Art. 21 of Law 287/90). Content and regime of the regulatory function are investigated taking into account the boundary between public regulation and private self-regulation, with particular attention to the relationship between the exercise of power and the protection of subjective legal positions, as well as the instruments of regulation, such as participation through procedural consultation and discipline of AIR and VIR. Attention to participation in regulatory procedures is also present in research on private economic activities and general interests, where the analysis of regulation and programming is concentrated on the instruments of regulation by Independent Administrative Authorities, especially the Regulatory Authority for Networks and Environment Energy. Furthermore, as a research topic in the environmental field, the study of authorizing procedures in the management of waste plants should be underlined. Public intervention in the forms of regulation and programming is also the subject of research in the pharmaceutical field, where the guarantee of access to the medicine is declined in the perspective of planning, with reference to the administration of the price of drugs, to the pharmaceutical production, to the pharmaceutical distribution, to the service of public pharmaceutical control.

KEYWORDS: public economic law; modern theory of party autonomy and public organizations; antitrust authority; independent administrative authorities; public contracts.

21.6 Economic factor and linguistic minorities: between identity issues and social integration

V. Piergigli

During the last decades, the European societies have becoming less and less homogeneous. Everywhere the migratory flows and the mobility of people are among the main reasons of the increased complexity and heterogeneity of our societies. On the other hand, the economic and financial crisis of recent years, together with the threat of international terrorism, have led the states to progressively close their respective borders and to rethink restrictively the policies experimented in the past for social integration and promotion of minority cultural identities, as well as for the granting of citizenship.

The minority communities, bearers of identity values distinct from those of the national majority of the population, are no longer just the 'old' minorities, that is the historical or autochthonous ones composed of state's citizens, but also the 'new' minorities, made up of third-country nationals, regularly residing in the national territory. The connected issues of the protection of cultural identity of all linguistic minorities and the promotion of integration in the host society, in particular with regard to the new minorities, urge the states to cope with new challenges, also due to the lack of direct competences on these subjects on behalf of the European Union.

Nevertheless, some important signs in the sense of identifying a set of common minimum standards for protection and integration of persons belonging to (old and new) minorities are coming from the EU Court of Justice, as well as from the Council of Europe. More specifically, the Council of Europe promoted two significant multilateral conventions, largely ratified but not fully implemented by the member states, respectively aimed at protecting the rights of persons belonging to national minorities and safeguarding minority languages.

KEYWORDS: economic factor; linguistic minorities; identity issues; social integration; EU Court of Justice; Council of Europe; minorities rights.

Name index

This book provides an overall picture of the research activity carried out in the Department of Economics of Roma Tre University, with the purpose of fostering collaborations with scholars from Italian and international universities and providing prospective students with information about the interests they will be able to pursue should they enrol in the Department's master degree or PhD programmes. The various research projects outlined mirror all the interests cultivated in the Department, which includes scholars in macro and micro economics, economic policy, finance, statistics, mathematics, business economics, and law.

Attilio Trezzini is Associate Professor of Economics, Roma Tre University.

ROMA TRE
UNIVERSITÀ DEGLI STUDI