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Research Statement

A key component of most strategic interactions is the location of the agents. Location should not only be defined in a narrow spatial sense: it can be social, as in social networks, where it is defined by links of friendship; or it can be defined by other types of links (culture, gender, relations) that matter to the agents. Studying the effect of location on economic outcomes poses challenging empirical questions, including the need to distinguish between self-selection (i.e., when location is chosen), contagion effects, and exposure to common shocks.

In my research, I attempt to deal with these problems. My strategy is to develop sound econometrics techniques, together with a theoretical model that can guide the interpretation of the results. My papers acquire different connotations according to the definition of space considered, i.e., according to the sources of interdependence between economic agents. In my research I use three main qualifications of the spatial dimension: (i) social networks; (ii) residential location; (iii) culture.

(i) Social Networks

Past research. In studying social network effects, we need to disentangle the effect of social interactions from own (and peers’) characteristics and preferences. In most of my papers in this area, my approach is to exploit the architecture of social networks to achieve the identification of social interactions and to employ network models of peer effects to understand the underlying behavioral mechanism.

A representative paper is [9]. In this paper, we make three main contributions:

1) The Katz-Bonacich index is a measure of network centrality widely used in sociology. In our paper, we provide the first (and so far only) micro-foundation of this concept. We develop a model that shows that, at the Nash equilibrium, the outcome of each individual embedded in a network is proportional to his/her Katz–Bonacich centrality measure.
2) We provide an identification and estimation strategy for the analysis of peer effects with network data. In particular, we characterize the exact conditions on the geometry of the peer network, so that the model is identified.

3) We apply this methodology to a detailed dataset of adolescent friendship networks. We show that, after controlling for observable individual characteristics and unobservable network specific factors, a standard deviation increase in the Katz–Bonacich centrality increases the pupil school performance by more than 7 percent of one standard deviation.

Other important papers in this line of research are [14] and [5]. In [14], using the same data and a similar identification strategy as in [9], we investigate the importance of weak and strong ties in criminal decisions. In [5], we test a model of crime with peer effects and conformist preferences. (i.e., where the utility is higher the more the individual conforms to the group behavior). The latter paper received the Oliver E. Williamson Prize for the Best Article published in the Journal of Economics, Law & Organization in the years 2010-2011.

**Current research.** My research in this area has evolved along three perspectives:

(i.1) Applications in financial and housing markets;

(i.2) Econometrics of network models;

(i.3) Online social network data analysis.

### (i.1) Applications in Financial and Housing Markets

**Financial Markets.** In the wake of the financial crisis, networks of mutual exposures and contagion effects are at the forefront of the political debate. The richness of financial data provides a promising opportunity for network analysis.

In [22] we use a unique data set of transactions from two financial futures contracts traded on the Chicago Mercantile Exchange (CME). The dataset includes information for transactions from the month of August for the September 2008 e-mini S&P 500 and Dow contracts. It consists of time-stamped transaction-level quantities, prices and counterparty identifiers for all transactions during August of 2008. The dataset includes more than 7 million trades across more than 30,000 accounts for the S&P 500 and more than 1 million trades across more than 7,000 accounts for the Dow. Using unique information that identify counterparties to a transaction, we document and
seek to explain the fact that the network pattern of trades captures the relationships between behavior in the market and returns. Our approach includes a simple representation of how much a shock is amplified by the network and how widely it is transmitted. This representation provides a possible short-hand for understanding the consequences of a fat-finger trade, a withdrawing of liquidity, or other market shock.

This project has received a grant from the Europlace Institute of Finance in 2012.

**Housing Markets.** One of the reasons for suggesting government intervention in the housing market is inefficiency in housing consumption. Housing renovations improve not only one’s own property but also neighbors' property values. However, this externality is not internalized in the individual’s calculation of whether or not to undertake an improvement. As a results, the marginal social benefits of the improvement exceed the private marginal costs, and the property owner is likely to invest less than a socially efficient amount. Under this perspective, the existence of peer effects could overcome the underprovision of local public goods.

In [26], we use detailed data on friendship networks within neighborhoods to investigate the importance of social interactions in one's own residential neighborhood in the demand for housing quality. We find evidence consistent with the presence of peer effects, especially for households living in urban areas. Our findings are in line with the prediction of a model where conformist preferences are the key element underlying economic outcomes that involve interactions with peers.

(i.2) **Econometrics of Networks**

Apart from the more applied work discussed above, I am also working on some more methodological issues concerning the empirical study of networks. The premises are my studies on panel data econometrics (see [15]). Three relate to the main direction of my current research: 1) Identification and estimation of social network models; 2) Test procedures to distinguish between alternative behavioral foundations; 3) Network model estimation with missing data.

In [25], we make three contributions.

1) A traditional linear-in-means model of social interactions represents peer effects using the average outcome of the peers. We provide a micro-foundation for a linear-in-means
model where group behavior is represented by the aggregate (rather than average) level of activity.

2) We provide the identification conditions for this model. We show that, in this case, the requirements to identify this model are weaker than for the traditional model.

3) We show the relevance of this modelling set up for policy purposes. We show that it grounds key player policies and evaluates their importance by using real-world data on juvenile delinquents in the U.S.

In [24], we develop a network model embedding the role of weak and strong ties in education decisions and consider the specification and estimation of social interaction models with different network structures. The empirical salience of the model is tested using a very detailed longitudinal dataset of adolescent friendship networks. We find that there are strong and persistent peer effects in education but peers tend to be influential only when they are strong ties (friends in more than one wave) and not when they are weak ties (friends in only one wave). We also find that this result does not hold in the short run where both weak and strong ties have an impact on current grades.

In [23], we develop a unified model embedding different behavioral mechanisms of social interactions, and we design a statistical model selection test to discriminate between them in empirical applications. This framework is applied to study peer effects in education and delinquent behavior for adolescents in the United States. We find that there are strong social multiplier effects in crime while, for education, social norms matter the most. This suggests that, for crime, individual-based policies are more appropriate, while for education, group-based policies are more effective.

In [33], we adopt a more structural approach to the identification of social interactions. We postulate and estimate a dynamic model with social interactions driven by norms of conformity. The restrictions imposed by the model allow us to measure the role of social interactions, distinguishing it from other determinants. In our application, we identify and measure social interactions as determinants of an index of risky behavior of adolescents, which includes smoking, as well as alcohol and drug consumption. We provide evidence about how these effects change over school years, due to the impact of addiction and endogenous variation in the
strength of social interactions and peer effects. We note that this is a prerequisite to design and evaluate, e.g., drug and alcohol prevention programs, as social interactions are externalities which induce inefficient behavior which justifies policy and educational interventions.

In [29], we make two contributions:

1) We consider the estimation of a network model with missing values on the dependent variable. We characterize the bias in the estimator which is commonly used to estimate social interaction effects in network model and develop a non-linear least square estimator, which is consistent and asymptotically efficient.

2) We analyze peer effects in sleeping behavior using a representative sample of U.S. teenagers, finding not-negligible endogenous effects. That is, we show that the sleeping behaviour of the friends is important to shape own sleeping behaviour, besides the impact of individual and friends characteristics.

In [34], we tackle problems related to an endogenous network formation in the context of a production function model that transforms worker inputs into outputs through peer effect networks. The distinguishing features of this production model are that the network is formal and observable through worker scheduling, and selection into the network is done by a manager. We discuss identification and suggest a variety of estimation techniques. In particular, we tackle endogeneity issues arising from selection into groups and exposure to common group factors by employing a polychotomous Heckman-type selection correction. We illustrate our method using data from the Syracuse University Men's Basketball team, where at any point in time the coach selects a lineup and the players interact strategically to win games.

(i.3) Online social network data analysis

I am interested in understanding how the information diffusion in massive online networks influences social and economic outcomes, including demand patterns, ecommerce behavior and word of mouth advertising.

I am the Principal Investigator of a project financed by the Italian Ministry of Education, which has made possible the realization of a social network platform in a high school in the Tuscany region of Italy. I am now exploring a variety of experimental settings that would be implemented soon.
I am also involved in a field experiment on social networks and education in Bangladesh. My recent paper [3] applies network analysis techniques to organized criminal networks (U.S. Mafia).

\textit{(ii) Residential Location}

\textbf{Past research.} This area of my research focuses on the importance of the geographic (rather than social) space in economics decision making. Papers [2], [8], [11], [12], [16], [17], [18], [19], and [20] look at location effects in the labor market. A representative paper is paper [16]. In this paper, we make two main contributions:

1) In spatial econometrics, spatial correlations indicators (such as the Moran’s I) are widely used. They assess the existence of geographical patterns in the observed variables. In this paper, we provide a microfoundation for spatial correlation effects. By explicitly considering the spatial dimension of local regional labor markets, we develop a simple dynamic model that explains the spatial correlation between unemployment rates.

2) We then test this model by using a longitudinal dataset of Travel-To-Work areas in the UK. Our evidence shows a significant spatial dependence that has been growing over time and characterized by a low distance decay. Highly localized effects are explained by commuting flows.

Paper [19], introduces a spatial dimension in search-matching model and tests it using panel data for the UK. Paper [20] is the first to provide evidence of the spatial mismatch hypothesis in Europe.

\textbf{Current research.} My research in this area has moved towards the search of novel datasets that attempt to solve the traditional empirical issues when assessing residential location effects.

In [21], we use a new dataset on eight Italian cities and a novel identification strategy to analyze the relationship between the employment status of migrants and the percentage of migrants living nearby. The data contain information at the very local level (i.e., the residential block) and are representative of the population of both legal and illegal migrants. Identification is based on an instrumental variable strategy that exploits the physical characteristics of the local buildings as a source of exogenous variation in the incidence of migrants in each location. We find
evidence that migrants who reside in areas with a high concentration of non-Italians are less likely to be employed compared to similar migrants who reside in more mixed areas. This penalty is higher if the migrants living nearby are illegal and it is not mitigated by living close to migrants who are from one’s own ethnic group nor who are more proficient in the Italian language. The employment prospects of natives do not appear to be affected by the vicinity of migrants.

In [32], we attempt to shed light on the adverse effects of spatial concentration of poverty and unemployment that may impede employment opportunities for local residents. Our analysis will draw on the 1985, 1989 and 1993 neighborhood cluster file in the American Housing Survey (AHS). Each cluster is comprised of a core housing unit and its ten closest neighboring units, and each of these homes is surveyed in the three years noted. The opportunity to follow individuals who remain within the clusters across survey years while also observing new arrivals and departures provides a unique set of opportunities to identify peer and labor market networks effects.

(iii) Culture

Past research. Culture can be defined as a group-specific behavior transmitted by social learning. If one has this definition in mind, then the analysis of culture in economics decisions is a natural area of interest in my research. There is increasing evidence in the economic literature about the importance of cultural dimensions and their evolution to explain a variety of socio-economic phenomena. To approach this topic, I use the economic framework of cultural transmission and socialization developed by Bisin and Verdier (2000, 2001)\(^1\). In this framework, preference transmission is partly the result of purposeful actions undertaken by socializing agents, and external influences embedded into specific socio-economic contexts.

In [6], [7], [10], and [13], culture is measured as ethnic or religious identity. They are related theoretically to the emergence of oppositional minority identities and empirically to the patterns

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of cultural and economic assimilation of immigrants in Europe (more broadly to differences in economic performance between groups).

In [27] we use the information contained in the recent waves of the German Socio-Economic Panel (SOEP) for the years 1996 to 2011 to show the extent to which friendship with natives can be considered as an indicator of cultural assimilation. We exploit three specific features of this data: (i) the detailed information on cultural issues - including crime, environmental protection and the political domain - that are salient to the native population; (ii) the friendship roster, that allows us to distinguish German and non-German friends; (iii) the longitudinal dimension, which allows us to both control for individual fixed effects and make progress in the identification of the causal link between friendship formation and important life-course events such as education attainment, employment, marriage, childbirth and residential mobility. We document that migrants with a German friend are more similar to natives than those without a local companion along several important dimensions, including engagement in social activities, concerns about the economy, interest in politics and broad policy issues like the environment, crime and xenophobia. When looking at the determinants of friendship acquisition, we find that the acquisition of a new job is a significant factor of social network variations. Other factors driving the acquisition of a native friend include the number of years the migrant has spent in the country, the birth of a child, residential mobility and additional education in the host country.

In [4], we instead use the Bisin-Verdier model of cultural transmission to investigate the intergenerational transmission of education. Under this perspective, our analysis contributes new knowledge to inform policies to promote social mobility. We make two contributions:

1) We analyze the intergenerational transmission of education, focusing on the interplay between family and neighborhood effects. We develop a theoretical model suggesting that both neighborhood quality and parental effort are of importance for the education attained by children. This model proposes a mechanism explaining why and how they are of importance, distinguishing between high and low-educated parents.

2) We then bring this model to the data using a longitudinal dataset in Britain. The available information on social housing in big cities allows us to identify the role of neighborhood in educational outcomes. We find that the better the quality of the neighborhood, the higher the parents’ involvement in their children’s education. A novel finding with
respect to previous U.S. studies is that family is of importance for children with highly educated parents, while it is the community that is crucial for the educational achievement of children from low-educated families.

In [28] the role of cultural factors is contrasted with the one of policies and institution. We investigate the changes in women's participation patterns across 15 EU countries over the last 20 years using individual data from ECHP and EUSILC databases. Our findings show that the observed trends in female participation differ substantially both across countries and across different groups of women. We explore such heterogeneity in trends by looking at the effects of policies and labour market institutional factors on the participation of women with different family and individual characteristics. Our estimates reveal a role of policies and institutions that is stronger than what has so far been assessed. Labour market institutions and family-oriented policies explain almost 25% of the actual increase in labor force participation for young women, and more than 30% for highly educated women. Surprisingly, changes in the institutional and policy settings contribute less in explaining the participation of low-skilled women. We also find that reforming the institutional framework towards a model of "flexicure" labour market is effective in enhancing women labour supply only when deregulation is accompanied by sufficient social compensation.

**Current research.** I am interested in understanding how different value systems influence economic outcomes and how different patterns of social interaction affect the link between family values and economic outcomes.

Paper [30] explores a novel mechanism of gender identity formation. Specifically, we explore how a teenager's own mother, as well as her friends’ mothers work behavior affect her work decisions in adulthood. The first mechanism is commonly included in economic models. The second, which in social psychology is also emphasized as an important factor in gender identity formation, has so far been overlooked. Accordingly, our key theoretical innovation concerns how the utility function is modeled. It is assumed that an adult woman's work decisions are influenced by her own mother's choices, as well as her friends' mothers’ choices when she was a teenager, and the interaction between the two. The empirical salience of this behavioral model is tested using a network model specification together with data on a cohort of women in the U.S. We
find that both intergenerational channels positively affect a woman's work hours in adulthood, but the cross effect is negative, indicating the existence of cultural substitutability. That is, the mother's role model effect is larger the more distant she is (in terms of working hours) from her friends' mothers.

In [31], we seek to understand precisely how two widely studied channels of socialization/cultural transmission (parents and peers) impact the transmission of the culture of violence. We propose to do so by looking at gun-ownership among young adults in the U.S. Using evidence from a unique dataset which provides information on the network of peers and family influence, we will gauge the relative influence, importance and persistence of these two important channels of socialization, while controlling for a large set of information regarding socio-economic backgrounds, neighborhood and school effects.

Gun control is one of the most controversial issues in American politics, as gun ownership is strongly correlated with gun violence. Knowing the relative importance of socialization factors in the determination of gun ownership will therefore be relevant in shaping the debate about the most effective way of restricting availability of firearms within the United States.

LIST OF PAPERS


**Working papers**


**Work in progress**

[29] Sleeping Pattern in Adolescent Networks (with Xiaodong Liu and Edoardo Rainone)

[30] Mother, Friends and Gender Identity (with Claudia Olivetti and Yves Zenou)

[31] Guns in America and the Culture of Violence: Disentangling the Channels of Cultural Transmission (with Carlo del Bello and Paola Giuliano)

[32] Peer pressure, Information Spillovers and Labor Supply (with Nuno Mota and Stuart Rosenthal)

[33] Dynamic Peer Effects and Health Risk Behaviour (with Alberto Bisin and Onur Özgür)

[34] Endogenous Network Production Functions with Selectivity (with William C. Horrace and Xiaodong Liu)