# Alma Mater Studiorum - Università di Bologna
## DEPARTMENT OF ECONOMICS

# Multilevel Transmission of Cultural Attitudes and Entrepreneurial Intention: Evidence from High-School Students

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## *Evidence from High-School Students*

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**Abstract**

Intention toward any occupational choice can be widely categorized as a rational choice process combined with a subjective attitude function. There is extensive literature dealing with the formation of intention toward entrepreneurship in adolescents, in particular as a result of either parental (vertical) transmission of social capital or network effects from peers or neighbours (the latter two being two different levels of horizontal transmission varying in proximity in terms of bonding and bridging). We contribute to this literature by considering the joint effect of all these three levels simultaneously, in order to avoid an underspecification of the model due to omission of important cultural factors. We hypothesize that such three levels identify a mechanism where the individual perception of their importance interacts with their objective characteristics. With data for second-year high-school students, and employing empirical triangulation through Logit and 3SLS methods, we find evidence for a strong parental effect and of secondary peer effects on student intention. We also detect clear endogenous effects from the neighbourhood and the overall cultural context. Moreover, entrepreneurship is confirmed to be perceived, even by students, as a buffer for unemployment and social mobility.

**Key words:** social capital, cultural capital, peer effects, intention toward entrepreneurship, uncertainty.

**JEL classification:** R32, R38, Z10, J60.

## 1 Executive Summary

Entrepreneurial intention is known to be related to one's social capital and the cultural inter- and intra-generational transmission of socio-economic attitudes and status (see, e.g., Laspita et al. 2012). However, such sources of influence on individual intentions are not yet fully examined as components

of a common mechanism driving individual preferences, and entrepreneurial intention in particular. The overall cultural endogeneity of personal networks and intention toward entrepreneurship is not typically accounted for either.

This study aims to model a culture-driven endogenous mechanism of social capital transmission in the formation of adolescents' intention toward entrepreneurship. This mechanism operates in a Schumpeterian quality-ladders model with two main inputs: economic feasibility and individual expectations. The latter factor is analysed in a multilevel dependence with: (i) the classical Bourdieuian vertical transmission of social capital; and (ii) network effects – where peers or neighbours exercise horizontal transmission of cultural attitudes. We employ primary data for about 2,000 second-year high-school students from the city of Palermo, Italy. As a first step, a horserace between the horizontal and vertical channels of cultural attitude transmission is performed in exploratory OLS and Logit models. Next, to tackle cultural endogeneity issues, we employ a three-stage least squares (3SLS) estimation. Our results suggest that besides the leading feasibility factor, parental social capital transmission has the strongest impact on students' entrepreneurial intention. Peer effects show relevance for only the most entrepreneurially prone students. Yet, this process of contextual transmission turns out to be strongly culturally endogenous. In addition, entrepreneurship is confirmed to be perceived – even at this early stage of life – as a tool for social mobility and a buffer for unemployment in periods of adverse economic conditions.

## 2 Introduction

Although widely investigated, the impact of social capital on intention toward entrepreneurship among adolescents and young adults still remains a phenomenon that is somewhat vaguely understood (see Arrighetti et al. 2015; Gartner et al. 2004; Laspita et al. 2012) (Fafaliou, 2012). This vagueness is due to the multiple facets that different streams of empirical literature emphasize when trying to reveal new aspects of social capital impact on the intention formation of an individual. In

the present paper, we aim to provide a more structured understanding of the channels through which social capital impacts on adolescents' intention toward entrepreneurship, and of its link to cultural attitudes and cultural context *per se*. Meanwhile, we focus on the differences between three levels of social capital, in terms of the proximity *i)* between the individual and her group/network – social capital in the family; *ii)* between peers; and *iii)* between the individual and the (local) social capital of her neighbourhood.

We adopt a Schumpeterian approach by assuming that students' intention toward entrepreneurship is a mixed choice function, that is, choice is driven simultaneously by an objective rational economic input, and by expectations about the returns from engaging in entrepreneurial activity. We motivate a cultural augmentation of the Schumpeterian model by synthesizing the main streams of literature on the factors influencing the formation of entrepreneurial intention. A special emphasis is placed on the social and cultural capital literature, dealing with the individual (personal attitude) and context (peers and neighbours) levels and, most importantly, on their unexplored interaction. Finally, we examine the two most widely accepted mechanisms of cultural transmission: parental (vertical) and contextual (horizontal) transmission. The cultural endogeneity of these attitudinal transmission models is discussed and empirically addressed as well. Thus, we offer a model of endogenous cultural transmission, where the individual and local dimensions of the influence of parents, peers and neighbours are combined in a testable mechanism.

We analyse this multilevel mechanism according to the Schumpeterian quality ladder model (Barro and Sala-i-Martin 2004; Tubadji and Nijkamp 2015) (see Schumpeter, 1942; Aghion and Howitt, 1992). Controls for perceived feasibility, as well as for personal and socio-demographic characteristics are employed. In addition, we test the standard idea of entrepreneurship as a tool for social mobility and against unemployment. For this purpose, we use two control variables: one for the self-reported desire to leave her/his own neighbourhood, and the other accounting for possible

changes in the economic status of the family.[1] To further support our findings, we implement alternative econometric estimations, and find consistent results across different empirical methods.

The paper is organized as follows. Section 3 presents a literature overview motivating our working hypotheses based on (Kahneman 2011) and a Schumpeterian interpretation of cultural and social capital and of the peer effects literature. Section 4 introduces the particular multilevel model that will be operationalized in the current study. Section 5 describes our original dataset and our estimation strategy. Section 6 presents and discusses our empirical results. Section 7 offers concluding remarks.

## 3   Intention toward Entrepreneurship: Vertical and Horizontal Transmission

### *3.1 The Notions of Vertical and Horizontal Transmission of Cultural Attitudes*

Our model describing the formation of entrepreneurial intention is characterized by diverse interpretations and developments within the entrepreneurial literature. Firstly, 'intention' is standardly hypothesized to depend on basic personal and socio-demographic factors, such as gender, age, native/migrant status, professional background, experience and skills and 'passions' (see, e.g., Fischer et al. 1993; Huyghe et al. 2016; Kourilsky and Walstad 1998) (Carland et al., 1988). Personality traits and motivations are often singled out in streams of the entrepreneurship literature (see Dubini 1989; Shapero and Sokol 1982; Zhao et al. 2010) (see McCleland, 1961). Contextual factors have been identified as a crucial determinant of intention as well (see Ajzen 1991; Boissin et al. 2009; Krueger 1993; Teoh and Foo 1997; Van Gelderen et al. 2015) (Naffziger et al., 1994; Arinius and Minniti, 2005). Independence (being one's own boss) has been outlined as yet another basic factor (besides economic capital) for entrepreneurial intention (see Henderson and Robertson, 2000).

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[1] If a deterioration of the economic conditions of the family has occurred, according to prospect theory (Kahneman and Tversky 1979) a change in the propensity toward entrepreneurship must consequently occur as a function of uncertainty avoidance mechanisms in human choice. Thus, our analysis will be informative on both the effect of the crisis on entrepreneurial intention and the possible distortion caused by economic shocks in the period preceding data collection.

To summarize these models, one should recognize that, in a way or another, they all identify in individual and local culture as well as attitudes as important determinants of entrepreneurial intention.

Finally, and most prominently, risk taking attitude has been indicated as a crucial psychological factor for intention toward entrepreneurship (Campbell 1992; Dai et al. 2014; Falck et al. 2010; Van Praag and Cramer 2001). In particular, it is the leading explanatory factor according to the classical entrepreneurial literature. A stylized example of this is the Schumpeterian quality ladder model, which contains the net present value (NPV) function. Given an equal knowledge level, Schumpeter's NPV is a function which opts over investing or not into a proposed (research & development) idea on the basis of two criteria: the overall investment required (i.e., the physical input) and the expected return (i.e., in essence, the attitude to and perception of riskiness of the investment).[2] As clarified by (Sen 1993), with his distinction between internal and external preferences, and more recently by Tubadji and Nijkamp (2015), for migrants' location choices, and Minola et al. (2016), for the effect of age and local culture on entrepreneurial intention, cultural attitudes affect one's decision through an interaction mechanism between individual and local culture. This understading can be applied also in our case, by distinguishing between individual and local risk, and uncertainty impact on entrepreneurial intention.

The above leads us to the formulation of our first working hypothesis:

**Hypothesis 1.** *One's entrepreneurial intention is a function of both individual uncertainty (idiosyncratic internal drive for action) and the contextual average level of uncertainty.*

Furthermore, one's psychological risk and uncertainty attitude and individual value system *per se* have been established in the literature as being dependent on two types of contextual influences: parental and network (peers or neighbours) effects. Bourdieu's (1986) cultural capital hypothesis[3]

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[2] This Schumpeterian approach has its origins and tradition in the Austrian school of economics, of which Schumpeter was always recognized as a natural member (see Santarelli and Pesciarelli 1990).

[3] Cultural capital was defined in a self-standing manner in the economics of education literature (see De Graaf et al. 2000; De Graaf 1986). The impact of parental attitudes, preferences and cultural participation on the students' performance

states that parental skills, their prestige in society and their cultural participation largely influence their children's individual's value system and ultimately their socio-economic success. Coleman (1966), on the other hand, established that not the investment in education such as class size and appliances available, but peer effects[4] (horizontal transmission) determine the socio-economic success of a student (Epple et al. 2003) (see related research by Robertson and Simons, 2001; Hanushek,1986; Hoxby, 2000). Putnam added the understanding of networking with the context on different leves of proximity: bonding (for closer relations) and bridging (for more distant relations) (Putnam 2001). Granovetter (1973) stressed the cohesive power of weak ties, arguing that the strength of two individuals' tie to one another affects the degree of overlap of their friendship networks. And finally, (Burt 1992, 2000) clarified the weak ties being even more important than the strong networking connections, due to opening ways to the less probable (and therefore potentially most profitable) opportunities. And in this line, the ambivalent nature of the impact from social capital, networking and the local cultural context (including diversity) was clearly demonstrated (Bakens et al., 2015).

Researchers have tried to merge these concepts in the literature on intention toward entrepreneurship (see, e.g., Westlund 2006). Rich empirical evidence and theoretical augmentation of the above theories have been also gathered in a partial and unbalanced manner in differently focused studies (see Fafaliou, 2012). Cultural capital, sometimes approximated with information about parents (and even grandparents), and social capital have been analysed as sources of influence on students' intention toward entrepreneurship (Laspita et al. 2012). Peer effects among students influence the formation of individual intention toward entrepreneurship in two ways: through the

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and career choices has been prolifically investigated (see, among others, Katsillis and Rubinson, 1990; Dumais, 2002). In a recent application, cultural capital's influence on the wage differentials of university graduates was examined through an augmented Bourdieu-Mincer model (Tubadji et al., 2014). Its impact on entrepreneurial intention formation, instead, was addressed, among others, by Laspita et al. (2012) and Light and Dana (2013).

[4] Peer effects have been defined within the domain of the economics of education as well, as a factor denoting intention toward entrepreneurship and general propensities among students (Card and Krueger, 1992; Andresson and Larssin, 2013). When the horizontal effect is operationalized with the individual networks of equals in terms of socio-economic status (a colleague among colleagues, a friend among friends, a neighbour among neighbours, etc.), the influence from the group to the individual is termed peer-effect transmission of social capital (see, e.g., Field et al. 2016; Nanda and Sørensen 2010).

communication between the students of information about their experience, and through the sharing of their cultural perceptions of whether entrepreneurship is worth undertaking as an activity (Varela et al. 1991).

Moreover, the different subfields of the entrepreneurship literature[5] have revealed a variety of approximations of social capital, showing the numerous possible sources of both horizontal and vertical transmission of social capital: from parents (Wyrwich 2015), grandparents (Laspita et al. 2012), spouses (Moog and Backes-Gellner 2009), school peers (Liñán and Santos 2007; Muntean et al. 2010), or work peers and neighbours (Backman and Karlsson 2013). The varied quantifications of social capital also demonstrate that it has many facets of trust, which lead to dissatisfaction with its lack of conceptual precision. The attention to cultural capital transmission in the entrepreneurship literature is somewhat lopsided too. Indeed, the idea for transmission, which is the original Bourdieuian term to describe the impact from parental cultural capital on the students' cultural capital, and ultimately on their socioeconomic success, is fairly well established (see Bourdieu 1977, 1986; Bourdieu and Passeron 1977; Wyrwich 2015). However, in the post-Bourdieu literature, only a few studies (see Light and Dana 2013) have employed the full definition of cultural capital.

The lack of bridging between the notions of cultural and social capital, and the terminological confusion induced by sometimes finding a sign of equality between them, leads to the need to fill this gap. That is why attempts for a new conceptualization of social capital in entrepreneurship have also emerged (see, e.g., Westlund and Bolton 2003; Williamson 2000). However, starting to conceptualize social capital anew obviously yields much more simplified and underdeveloped structures than the established conceptual frameworks already available from sociology.

In sum, one's expectations, involved in forming intention toward entrepreneurship, can be basically understood as a function of risk and uncertainty, which are attitudes shaped in individuals

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[5] The entrepreneurship literature has approached social capital transmission from the perspective of the utility from entrepreneurial activity, and has significantly contributed by enlightening varied facets of this relationship. In this respect, it can first be divided between regional (see Bosma and Sternberg 2014; Fischer and Nijkamp 2009; Fritsch and Storey 2014), meso (new economic geography firm level; see Kreiser et al. 2013; Saxenian 1994) and individual micro-level (see Liu and Lee 2015; Wahba and Zenou 2012) literature.

by the interiorization of local culture during the process of communication with the surroundings – the more immediate ones (such as parents) and further ones (social circles like peers and neighbours). Our further interpretation of such process is that a transmission model is fully specified culture-wise, only if it accounts for both individual and contextual cultural impact on intention. The contextual cultural factor influencing intention has two sources, with possibly different types of impact (Burt 2000; Estrin et al. 2013) (Seonhee, 2013), which have to be distinguished in a bridging and bonding sense, as: (i) the attitude toward entrepreneurship of the parents and (ii) the intention toward entrepreneurship of the student's peers in class and in the neighbourhood at large. In both cases, we hypothesize a cultural attitude transmission – respectively a vertical one and two horizontal ones (level 1 – from peers, and level 2 – from neighbours). This can be summarized as our second working hypothesis:

**Hypothesis 2.** *Both idiosyncratic and contextual uncertainties influence intention on multiple levels of proximity (the latter being specified as both formal distance and intensity of the relationships).*

What still remains to be considered is the possible interaction between the individual and contextual cultural factors and the general cultural endogeneity of uncertainty and individual intention toward entrepreneurship. The literature infers the vertical transmission as a cultural capital transmission (Bourdieu 1977; Bourdieu and Passeron 1977; Light and Dana 2013), whereas the horizontal transmission is often understood in terms of social capital transmission.[6] However, social capital is in essence an approximation of cultural capital (Guiso et al. 2006; Knack and Keefer 1997). Thus, both social and cultural capitals have as their source the local cultural value system, which every individual's intention is influenced by. That is why individual intention is not only a question of psychology and network/communication influences, but also a question of general embeddedness

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[6] See, for example, Wyrwich (2015) on parental transmission of values and entrepreneurship; Arrighetti et al. (2015) on family influence on entrepreneurial orientation; Moog and Backes-Gellner (2009) on partner peer effects and gender differences; Neira et al. (2013) on the link between social capital and human capital formation.

in the bigger picture of local culture and institutions (for a survey, see Alesina and Giuliano 2015). Therefore, besides examining the direct relationship between individual attitudes and parents' and peers' attitudes (in addition to physical inputs and standard controls), one has to account for the cultural endogeneity that might exist in this model.[7]

In the entrepreneurship literature, vertical transmission is taken as the transmission of social capital from the parents to their children (see Bisin and Verdier 2001; Pohja 2009) (Boschma and Wenting, 2007). This is in a way a simplification of Bourdieu's path of influence, which approximates cultural capital with social capital. This approximation becomes agreeable if one considers that what is termed social capital above is actually the attitude towards trust in others (friends, family, people in general, institutions, etc.). Objectively, this is only a cultural attitude representing the intention toward social capital building, while the actual social capital accumulated would be the size and characteristics of an individual's actual network and especially the intensity of her civic participation. Thus, in fact, the entrepreneurship literature is examining vertical transmission by reducing culture to only one of its aspects – the vertical transmission of the cultural attitude towards trust. Besides facing underspecification, this approach terms the phenomenon as social capital transmission, while it should be considered as transmission of the parental cultural attitude toward entrepreneurship. This statistically plausible equation may create definitional impediments for multidisciplinary cross-fertilization of the entrepreneurial and sociological literature on cultural and social capital. Moreover, this lack of precision in the use of terminology blurs the awareness regarding the cultural endogeneity of the attitudes transmitted to the individual from her context.

The cultural endogeneity issue is usually neglected in most of the research dealing with transmission mechanisms, although one cannot deny that there is a general tendency to certain propensities in a locality – this is the local culture. Culture is the local programming of the mind (see

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[7] For this purpose, we assume that the individual uncertainty could be used as follows as a regressor. It can be modelled as formed by local contextual networks and their level of social capital, and then used as an explanatory variable for individual intention (along with the relevant controls). Thus, the model will account for the hierarchical nature of one's context and its role in the determination of individual preferences as a function of the influence of the cultural context on both the indidual and her networks.

Hofstede 1983, 1984) according to which people spatially sort over time (Axelrod 1997). This implies that one's individual intention is being influenced before the networking effects from parents, peers and neighbours. But also, that one's attitudes are a product of the local context culture (Acemoglu and Robinson 2010).[8] Therefore, a proper quantitative analysis requires particular attention to the cultural endogeneity of the entrepreneurial intention formation, when vertical and horizontal transmissions are being exploited as explanatory factors. This can be summed up in our third working hypothesis:

**Hypothesis 3.** *Both vertical and horizontal transmission and the attitudes of others are culturally endogenous.*

Finally, in order to clarify this endogeneity, accounting for the separate contribution of the aforementioned sources of transmission (parents, peers, neighbours) is essential. To understand this multilevel mechanism better, we may resort to the concept of slow (analytical) and fast (heuristic) thinking (Kahneman 2011).

## *4.2 Fast Uncertainty and Slow Risk Evaluation in a Schumpeterian Quality Ladders Model*

In what follows, we adapt to our purposes Kahneman's (2011) analysis of culturally endogenous joint parental, peers' and neighbours' effects. We stress that intergenerational, (vertically transmitted) cultural capital can be associated with one's idiosyncratic internal limits to her own utility function, so that parentally influenced cultural capital is responsible for one's internal order of preferences (Sen 1993), which in turn influences choices. On the other hand, the influence of horizontally transmitted social capital on one's utility function is a product of revealed preferences, understood as socially

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[8] Social capital, in this context, can be understood as a proxy for local cultural attitudes to trust, as one of the most potent measures for approximating the impact of culture and its transmission between and within generations (Guiso et al. 2006).

conceived and education-inspired trade-offs and cost-benefit-analyses. This is the social capital impact on intention as a product of slow (analytical) thinking. In other words, the horizontal effect is related to the publicly approved and expressed order of preferences. Adopting this fast- and slow-thinking understanding of the formation of internal and external orders of preferences helps to identify cultural capital and social capital as components of the intention formation process of an individual. We can further interpret the above as individual intention including three components: (i) rational consideration of an opportunity given the economic incentives external to the individual; (ii) individual characteristics, source of the internal drive (desire for free riding); as well as (iii) contextual cultural limits – which modify individual drive – that is, the determinants of the revealed order of preferences. This intention-formation mechanism can be applied to entrepreneurial intention in particular, and especially for the case of adolescents (students), who are still more susceptible to their context, and in the process of formation of their perceptions. Finally, to accommodate for and understand the endogeneity knot, this mechanism could be viewed from the perspective of the theory of planned behaviour (Ajzen 1991), according to which one's choices are shaped under the influence of the institutional reality in which one is embedded (see Fowler and Christakis 2008; Kramer and Vaquera 2011). Thus, theory of planned behaviour unites the social and cultural capital transmissions under the understanding of institutions and culture. This line of reasoning finds a tangent with evolutionary perspectives on entrepreneurial activity (such as in Williamson 2000), and the 'performance persistence in entrepreneurship' literature (Fritsch and Wyrwich 2014).

Schumpeter's quality ladder model, on the other hand, suggests that entrepreneurial decision-making, when at a fixed level of knowledge, is a function of two main factors – the amount of capital needed for investment and the expected return on investment. This model allows us to venture in the big question about the cultural pre-selection of people venturing into entrepreneurship due to their risk and uncertainty preferences. Risk and uncertainty is a topic that is intensively reinvigorating in recent economic research in relationship to the current economic crisis (Beinhocker 2013; Soros 2013). But more importantly, this is a topic on which controversial empirical and even theoretical

work has emerged over the years (Frydman and Goldberg 2013; Keynes 1936; Knight 1921; Shackle 1949). Our interpretation here is that Schumpeterian investment decision can be understood as a proxy for intention toward entrepreneurship. Therefore, adopting the quality ladder model can help to explain in a most reduced and stylized form what most other existing models for entrepreneurship present in an  unbalanced manner on one or the other side. Schumpeter's model allows to focus on economic feasibility and cultural factors, when controlled for personal and socio-demographic characteristics. Then, cultural endogeneity can be modelled more precisely, by expressing the individual feeling of uncertainty as a product of the local cultural context. In other words, an adolescent's intention can be viewed as not directly but hierarchically depending on the parental and peers' social capital. While this recursive modelling of uncertainty as a product of the parental social capital is theoretically appealing, it is eventually a matter of empirical investigation. Our fourth working hypothesis is therefore the following:

**Hypothesis 4.** *Parental (vertical) transmission is formant for entrepreneurial intention at a hierarchical level, and drives the fast thinking of an individual, while the local peers network influences intention only horizontally, and modifies rational decision-making as a product of peers' influence on slow thinking.*

The next section presents the operational models expressing our hypotheses in a testable manner. The data and estimation strategy through which we plan to address them are outlined.

## 4   The Culture-Based Multilevel Model

### *4.1 Conceptual Overview of the Model*

The essence of our proposition in this paper is that before attitudinal transmissions at all get into stake, the local culture predetermines strongly one's individual attitudes towards choice, and this plays a formative role, together with rational cost-benefit analysis, towards intention. Furthermore,

we assume that this cultural influence might be channelled simultaneously through the horizontal and vertical transmission of cultural attitudes. Therefore, we hypothesize that all contextual transmission together with one's intention are culturally endogenous. At the same time, we expect that vertical transmission is stronger and influences choice more strongly through fast thinking, while peer and neighbour effects might be expected to a less culturally sensitive product of slow thinking.

Our conceptual framework is derived from a classical Schumpeterian model of intention toward entrepreneurship. We use the Schumpeterian quality ladder model as a basis for our model, by reinterpreting intention (as the desire to make an investment) as being derived by the objective part (economic capital) and the individual's expected return (i.e., the net present value of the investment). First, we modify this model by substituting expectations with the probabilistic risk and potential surprise function (as with Knight 1921; Shackle 1949). Risk evaluation is our slow thinking and consideration according to what we know. When information is limited about the implementation of an idea, no precise risk evaluation can be implemented and the reliance on fast thinking, or guts feelings, is leading to truncating away of ideas for which our perception is that the potential surprise is too high.

Next, we adopt a culture-based development (CBD) approach to consider jointly the effects from individual and group cultural bias on human choice (Huggins and Thompson 2015; Tubadji and Nijkamp 2015) (see Tubadji, 2013; Tubadji and Nijkamp, 2014). The CBD perspective suggests that while slow thinking and risk evaluation might be partially related to objective feasibility, there is a part of it which, together with uncertainty, is subject to contextual cultural influences and individual susceptibility to this context. Put differently, besides the objective feasibility of an idea, there is the contextual opinion about it. And our own degree of embeddedness and dependency on the others in forming our opinions is what will ultimately influence our own intention to accept an idea, with a particular perception for its feasibility as a fast thinking bias.

Next, the context and one's susceptibility to it biasing us can be segmentally viewed in proximity levels – following Putnam – as caused by closer and further relations. Namely, an adolescent's context

can be divided into her parental context, her peers (school fellows) and her neighbours. Thus, we first consider the social capital of the different contexts. Additionally, we take into account the student's embeddedness and susceptibility to each level of influence in terms of the trust one declares toward it, as a measure of her openness to transmission of attitudes.

In other words, human behaviour is assumed rational. However, one's rational choice given the same inputs will tend to differ, that is, to be culturally relative, due to the horizontal and vertical transmission of local cultural attitudes through the different contexts (such as parents, peers and neighbours networks). These differences are due to the fact that the individual interacts with, and feels certain individual level of embeddedness in, each of these contexts.

## 3.2 Operationally Testable Model

In this section, we operationalize the above propositions in the framework of a testable Schumpeterian quality ladder model for innovation, which is based on a function of expected risk and available financial investment. As in a neoclassical model, an individual's intention toward becoming an entrepreneur depends on two factors: (i) objective economic capital and the awareness of its existence and availability (i.e. the feasibility of the project), and (ii) one's evaluation of the net present value of the entrepreneurial investment. However, expectations vary according to heterogeneous individual attitudes. Therefore, we must acknowledge the existence of bounded rationality bias, due to differences in human propensities, in human choice. This bias can and should be approached empirically, if unbiased estimation of choice likelihoods are to be obtained. For this reason, we augment the (rational) Schumpeterian model with the factor which is the source of bounded-rationality bias in net present value evaluation. According to CBD, this source of bounded rationality is local culture, which in this paper is approximated with parental and peers social capital. This reasoning can be summarized as follows:

$$Inv = \beta_1 Z + \beta_2 ExpNPV + e_1; \qquad (1)$$

$$EI = \beta_1 Z + \beta_{21} Feasibility\_risk + \beta_{22} Uncertainty + e_1; \qquad (2)$$

$$EI = \beta_1 Z + \beta_{21} Feasibility\_risk + \beta_{221} Indiv\_Uncert + \beta_{222} Context\_Uncert + e_1. \qquad (3)$$

Equations (1)–(3) demonstrate how the main mechanism of the Schumpeterian quality ladder model, at fixed rung (i.e. level) of knowledge, can be transformed into our model for entrepreneurial intention based on slow-risk and fast-uncertainty evaluation, as well as cultural attitudes transmission. In Equation (1), *Inv* denotes inclination to invest, *Z* denotes the required capital for the investment,[9] *ExpNPV* denotes the net present value of the investment under consideration. In Equation (2), *EI* denotes entrepreneurial intention (assuming it can be acceptably approximated with investment intention). We substitute *ExpNPV* with its two components: *Feasibility_risk*, which denotes probabilistically knowable risk, that is, the probability of failure based on past experiences known by slow thinking; and *Uncertainty*, which stands for the fast-think intuitive judgement on matters for which there is not enough information from past experiences. Thus, Model (2) allows to state that, given the same information and skills, two individuals can reach the same feasibility risk evaluation. However, their uncertainty can differ. This is due to the cultural transmission of attitudes that each individual is experiencing and is exposed to in a unique path-dependent manner. Our model allows this component to vary, as it is expected in reality. Equation (3) demonstrates further how this naturally varying *Uncertainty* can be decomposed into two aspects: *Indiv_Uncert*, which denotes individual psychological proneness to uncertainty (i.e., character) and *Context_Uncert*, which stands for the intention toward uncertainty transmitted from the family and network contact with their cultural context. In other words, *Indiv_Uncert* is the person-specific tendency to be open toward one's environment, while *Context_Uncert* is the characteristic of the environment with which we enter into contact.[10]

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[9] For an extensive literature review on the different forms of entrepreneurially relevant capitals and the so-called pentagon model of capitals, see Baycan and Nijkamp (2012).

[10] For more detailed explanation on the pull and push cultural gravity forces created by the interaction of individual and local levels of the cultural factors, see Tubadji and Nijkamp (2015).

Next, both *Indiv_Uncert* and the *Context_Uncert* quantify the main channels for cultural attitudes transmission. They define the susceptibility to the transmission and the content of what is transmitted to the individual, respectively. In this sense, it is essential to account for the different types of transmission in terms of the proximity between the individual and the component of the context from which the attitude is transmitted. In Putnam's sense, the relationship can be close proximity, that is, a bonding-type of relationship (like the one between a parent and a child), or a more distant one, that is, a bridging type (like the proximity to peers or neighbours). However, this proximity can be either assumed theoretically, or analysed empirically using data regarding the embeddedness in a particular context and its social capital. In other words, both the extent to which one trusts her own context and the extent to which the context trusts its members determine the level to which one will allow either vertical or horizontal transmission. So, our take in this study is to distinguish theoretically between vertical and horizontal transmission, and to explore empirically which of the two is more strongly bound to proximity and the relevance of this dimension in the formation of entrepreneurial intention.

In short, our conceptual view of individual intention toward entrepreneurship suggests that intention is shaped: (i) vertically, as a function of the parents' social capital and its transmission to the offspring's social capital; and (ii) horizontally, as a function of the one's own character and interaction with the experiences of peers (level-1 horizontal transmission) and neighbours (level-2 horizontal transmission). So, for both horizontal and vertical transmission we consider always: (i) the individual character, and (ii) the characteristics of the level of the context, in order to capture the effect of proximity on transmission. Thus, Model (3) allows us to test Hypotheses 1 and 2.

However, cultural endogeneity occurs as an issue in Model (3). Namely, while feasibility is objective to all, and individual uncertainty is random, the component *Context_Uncert* depends on local culture as much as on the particular individual and her intention. Thus, both one's intention and the intention of her parents, peers and neighbours are affected by local cultural institutions. When we analyse a case where all observations come from the same institutional reality – e.g., from the same region – this endogeneity may seem negligible. However, there is a temporally-bounded inbuilt

dependence in the vertical transmission of cultural attitudes. Parents' attitudes are shaped over time before the offspring's. Furthermore, both peers and neighbours have been exposed differently to the local culture, and shaped as individuals by it, before interaction with the student. Therefore, it is still necessary for an accurate modelling of individual intention formation to take into account that the overall cultural context influencing uncertainty is different from the cultural context created by one's parents and networks. Thus, we can further transform Model (3) into a recursive model, as follows:

$$Context\_Uncert = \beta_0 Context\_Culture + \gamma X + e_1 \qquad (4a)$$

$$EI = \beta_1 Z + \beta_2 Feasibility\_risk + \beta_{221} Indiv\_Uncert + \beta_{222} Context\_Uncert + e_2 \qquad (4b)$$

In Equation (4a), we first express the contextual uncertainty of a place as a function of the local culture, denoted by *Context_Culture,* and a vector of controls *X* capturing one's susceptibility to the context (such as household income, as we know higher poverty is associated with higher reliance on extended family and social networks). Then, in Equation (4b), we plug in the dependent variable from Equation (4a) as an explanatory variable in previously defined Equation (3). In other words, our model first states that the level of social capital in different contexts is a product of local culture and generates the overall level of uncertainty that the environment will transmit. The model recursiveness implies that only in a second step one's intention is formed according to this contextual uncertainty.[11] Model (4) will serve the empirical operationalization of Hypotheses 3 and 4.

Standard control variables necessary for our model are the individual's personal and socio-demographic characteristics (such as gender, age, human capital). Moreover, in our empirical testing of the model, due to the rich data set available, we are able to control for additional factors of three types. First, we control for entrepreneurship being viewed as a mechanism for social mobility and/or as an unemployment buffer (see, e.g., Arrighetti et al. 2015; Guerra and Patuelli 2016; Thurik et al. 2008). Second, we distinguish between trust as a measure for healthy relationships, which is

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[11] It is only after modelling such cultural endogeneity of the parental and network contexts that one's own dependence on the local culture can be ignored without a loss of precision for the model.

established as a positive factor for socio-economic prosperity at the individual level (see, e.g., Vaillant 2012), and obedience to parents, which has been pointed out in some studies as a negative factor for prosperity and entrepreneurial activity (see, for recent literature reviews, Boz and Ergeneli 2014; Jelovac et al. 2011). Third, possible cultural differences, such as migrant status, are known from the literature to entail potential groupwise heterogeneity which could lead to bias. To take this aspect into account, we use information for the years of residence in the country. The next section describes in detail the available data and the methods used to test empirically Models (3) and (4).

## 5 Data and Methods

### *5.1 The Available Data Set*

Our data set is a result of primary data collection with standardised questionnaires distributed to students attending the second year of a representative sample of high-schools in the city of Palermo, Italy.[12] The questionnaire collects information about students and their parents, peers and neighbours, mostly focusing on human and social capital, in addition to cultural attitudes and socio-demographic characteristics. Moreover, the data set contains information about the financial status of the family, the educational background of the interviewee's parents and different aspects of the relationship between parent and child. The questionnaire contains overall 212 questions, mostly answered in a Likert scale format. The available data set includes more than 2,000 observations.

Our choices for operationalization of the elements in Models (3) and (4), which are the target of our empirical exploration, are explained in Appendix 1, where we discuss, for each model component, the question on which the variable is based, and the justification of its use. A detailed description of the variables is provided.

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[12] Data collection was implemented as part of the Futuro in Ricerca 2012 project 'Social and Spatial Interactions in the Accumulation of Civic and Human Capital', funded by the Ministry of Education, University and Research of Italy.

## 5.2 Estimation Strategy

The methodological approach adopted here is one of empirical triangulation (i.e., testing the same hypothesis by means of two alternative empirical methods; Denzin 1970; Downward and Mearman 2007). We start exploring our working hypotheses as follows: (i) first, we provide an initial exploration of the data using Model (3), which is estimated by ordinary least squares (OLS) and Logit models; (ii) next, we estimate the Model (4) by means of a three-stage least squares (3SLS) estimation.

Our primary statistical exploration provides an overview of basic descriptive statistics for the main variables of interest. This informs us on the likely explanatory power of the dependent (*entr_inten*) and explanatory variables.

We employ a basic OLS regression with robust standard errors in order to cross-check if correlation findings are confirmed in a multivariate regression framework. Our OLS estimations will inform us of the significance of economic and physical factors, together with the cultural factor, on the three levels of cultural transmission: parental, peers and neighbours, in explaining entrepreneurial intention. We also employ control variables for obedience to parents, entrepreneurship as a means for social mobility or as a buffer against unemployment, and migrant status.

We triangulate empirically these results by transforming the Likert-scale dependent variable for entrepreneurial intention into the binary variable *dum_inten8up* (where 1 indicates intention expressed with an intensity of 8 out of 10 or more), and by estimating a Logit model with the same explanatory variables. Our aim in this regard is twofold. On the one hand, a model with a behavioural basis such as the Logit allows us to gain in economic interpretation, in particular with reference to the implicit binary nature of the entrepreneurial choice. On the other hand, while using a binary dependent variable implies a loss of information, focusing on the highest segment of the measurement scale can provide us with possible indications of nonlinearity, if effect signs or significance levels change.

Moreover, it is crucial, within our empirical strategy, to deal with the endogeneity issue underlying individual intention and its contextual uncertainty, since such dimensions are strongly affected by aggregate local culture. As local culture is the same institution-wise, but different experience-wise for the individuals and the networks these individuals communicate with, it still makes sense to model them recursively as in Model (4). Here, one's contextual uncertainty is explained by the aggregate social capital possessed by one's context on all levels. Only in a second stage, we shall use this contextual uncertainty as an explanatory factor for the formation of individual intention toward entrepreneurship.

One's individual contextual uncertainty can be approximated (reversely) by the self-reported openness toward adventure. This is based on the assumption that more adventurous people handle their feeling of uncertainty better or experience lower levels of uncertainty per se. However, this approximation needs to provide findings that are consistent with the ones obtained from the (alternative) use of the variables determining contextual uncertainty (social capital of parents, peers and neighbours). Therefore, we first estimate our OLS and Logit specifications using the aforementioned contextual uncertainty variables, and we subsequently substitute them with *uncertainty_free* (self-reported openness to adventure). In case there is a consistent statistical support for this approximation, using *uncertainty_free* for modelling endogeneity is justified.

Finally, we use a 3SLS approach to estimate Model (4). In the first equation, we explain contextual uncertainty (*uncertainty_free*) with the social capital of parents, peers and neighbours, while controlling for home ownership, as a proxy for household welfare. Then, we use contextual uncertainty together with individual uncertainty (again, proxied at the levels of parents, peers and neighbours), as well as the rest of the explanatory and control variables already tested in the previous estimations, as determinants of individual intention. This approach allows to separate the cultural endogeneity of contextual uncertainty from the effect of personal characteristics, besides allowing us to explore in detail the formation of personal uncertainty as a function of the social capital of the different networks.

# 6 Results

## *6.1 OLS and Logit Models*

We start our analysis with descriptive statistics regarding our variables of interest (Table 1).

Table 1. Descriptive statistics

| Variable description | | Variable name | Obs | Mean | Std. dev. | Min | Max |
|---|---|---|---|---|---|---|---|
| Dependent variable 1 (OLS & 3SLS) | Entrepreneurial intention | *entr_inten* | 2,001 | 6.39 | 2.57 | 1 | 10 |
| Dependent variable 2 (Logit) | Strong entrepreneurial intention (8+), binary | *dum_inten8up* | 2,001 | 0.37 | 0.48 | 0 | 1 |
| Explanatory variables | | | | | | | |
| Economic investment | Home ownership, binary | *rent_h* | 2,004 | 0.73 | 0.44 | 0 | 1 |
| | Own financial resources, binary | *dum_resources* | 2,095 | 0.26 | 0.44 | 0 | 1 |
| Risk | Feasibility of entrepreneurship | *feasible_risk* | 1,975 | 5.21 | 2.30 | 1 | 10 |
| Individual uncertainty | Quality of the relationship with parents, binary | *dum_emb_parents* | 2,095 | 0.66 | 0.47 | 0 | 1 |
| | Intensity of the relationship with parents | *emb_par_intense* | 1,969 | 7.89 | 1.97 | 1 | 10 |
| | Free time spent in neighbourhood | *emb_neigh* | 1,998 | 5.03 | 2.78 | 1 | 10 |
| | Desire to leave the neighbourhood | *emb_neigh_control* | 2,059 | 4.86 | 3.17 | 1 | 10 |
| | Weekly interaction with friends | *emb_fr* | 2,050 | 4.22 | 2.11 | 1 | 8 |
| Contextual uncertainty | Social capital possessed by parents | *parents_trust* | 2,079 | 8.03 | 2.12 | 1 | 10 |
| | Social capital possessed by friends | *friends_trust* | 2,059 | 7.45 | 2.12 | 1 | 10 |
| | Social capital possessed by neighbours | *neigh_trust* | 2,032 | 6.66 | 2.23 | 1 | 10 |
| | Risk-loving attitude | *uncertainty_free* | 2,050 | 6.37 | 2.46 | 1 | 10 |
| Controls | Gender | *female* | 2,095 | 0.50 | 0.50 | 0 | 1 |
| | Age category | *age* | 2,091 | 3.47 | 0.75 | 1 | 6 |
| | School performance of previous year | hc_avg | 2,036 | 4.99 | 1.16 | 1 | 8 |
| | Math as preferred subject, binary | *talent* | 2,095 | 0.19 | 0.39 | 0 | 1 |
| | Worsening of economic condition of household | *welf_crisis_effect* | 1,973 | 5.82 | 1.88 | 1 | 10 |

This preliminary analysis offers a few insights into the data. The dependent variable *entr_inten* for entrepreneurial intention, when measured on a 1–10 Likert scale, shows an average value of 6.39, with a moderate dispersion (standard deviation is 2.57), suggesting a general presence of students

hypothetically prone to self-employment. We also transform this variable into a categorical variables, to differentiate between students with high intention and the rest. Therefore, the variable *dum_inten8up* assumes value 1 when *entr_inten* is equal to 8 or more, and 0 otherwise. In our data set, the percentage of respondents with such a high intention is about 40 per cent. The levels of social capital of parents, peers and neighbours appear to be similar, ranging numerically from 6.66 to 8.03. The categorical variable *dum_emb_parents* collects information about the quality of the respondents' relationship with their parents, which we take as a proxy for embeddedness. It takes value 1 when a smooth relationship with parents is indicated (66%), and 0 otherwise. The intensity of the relationship with the parents, *emb_par_intense*, is measured on a 1-10 Likert scale, and averages at 7.89, but with relatively high dispersion.

Our sample is evenly split between male and female, all interviewees have been living in the country in the previous eight years (i.e., they all grew up within the Italian educational and institutional system), and 19 per cent of them have a preference for math (i.e., tendency toward analytical thinking). About three quarters of students live in rented accommodations (*rent_h*), and when asked about possible resources to employ for founding a company (*dum_resources*), 26 per cent state that they would use own resources (rather than personal network or market ones).

We now proceed with some deeper exploration of the relationships between our variables. Table 2 presents OLS estimations results for Model (3). Five model specifications are presented, in increasing order of model complexity. We first employ no contextual cultural factors (column 1), then include them one by one (columns 2–4), and finally (column 5) horse-race them together (i.e. the variables *parent_trust*, *friends_trust* and *neigh_trust*). The results are consistent across all specifications. We find that intention toward entrepreneurship among students depends positively on perceived feasibility *feasible_risk* (denoting the role of slow thinking) and on the intensity of the relationship with the parents *emb_par_intense*. The latter result is in line with previous findings in the literature: healthy and intense interpersonal relationships have been recently documented in the

psychological literature to be the main source of social and economic wellbeing of an individual (Shah et al. 2014; Waldinger et al. 2006).

Table 2. Model (3), OLS estimation

| Dependent variable: entr_inten | Coef. | t-value | Coef. | t-value | Coef. | t-value | Coef. | t-value | Coef. | t-value |
|---|---|---|---|---|---|---|---|---|---|---|
| female | −0.059 | −0.59 | −0.036 | −0.35 | −0.036 | −0.36 | −0.048 | −0.48 | −0.014 | −0.14 |
| age | −0.028 | −0.40 | −0.010 | −0.14 | −0.022 | −0.31 | −0.033 | −0.47 | −0.017 | −0.23 |
| hc_avg | 0.023 | 0.51 | 0.017 | 0.38 | 0.019 | 0.44 | 0.017 | 0.39 | 0.010 | 0.22 |
| Talent | 0.011 | 0.09 | −0.010 | −0.08 | −0.020 | −0.16 | −0.001 | −0.01 | −0.020 | −0.16 |
| rent_h | −0.092 | −0.86 | −0.084 | −0.78 | −0.099 | −0.92 | −0.090 | −0.83 | −0.080 | −0.74 |
| dum_resources | 0.175 | 1.55 | 0.176 | 1.56 | 0.183 | 1.62 | 0.160 | 1.42 | 0.165 | 1.46 |
| feasible_risk | 0.661 | 25.00 | 0.654 | 24.70 | 0.663 | 25.11 | 0.668 | 25.33 | 0.663 | 25.06 |
| dum_emb_parents | −0.104 | −0.81 | −0.100 | −0.77 | −0.134 | −1.03 | −0.123 | −0.94 | −0.135 | −1.02 |
| emb_par_intense | 0.063 | 1.81 | 0.050 | 1.42 | 0.055 | 1.59 | 0.065 | 1.87 | 0.052 | 1.48 |
| emb_neigh | 0.028 | 1.43 | 0.028 | 1.40 | 0.025 | 1.28 | 0.027 | 1.38 | 0.028 | 1.40 |
| emb_neigh_control | 0.043 | 2.48 | 0.042 | 2.43 | 0.039 | 2.27 | 0.044 | 2.57 | 0.040 | 2.30 |
| emb_fr | 0.027 | 1.04 | 0.036 | 1.37 | 0.023 | 0.87 | 0.018 | 0.71 | 0.024 | 0.93 |
| parents_trust | | | 0.079 | 2.98 | | | | | 0.066 | 2.19 |
| friends_trust | | | | | 0.062 | 2.32 | | | 0.044 | 1.45 |
| neigh_trust | | | | | | | 0.016 | 0.65 | −0.013 | −0.47 |
| welf_crisis_effect | 0.072 | 2.40 | 0.073 | 2.44 | 0.072 | 2.41 | 0.067 | 2.23 | 0.069 | 2.31 |
| Constant | 1.811 | 3.52 | 1.216 | 2.31 | 1.456 | 2.71 | 1.765 | 3.28 | 1.169 | 2.14 |
| F test | (13, 1751) = 65.58 | | (14, 1746) = 61.62 | | (14, 1738) = 62.85 | | (14, 1730) = 62.01 | | (16, 1717) = 55.53 | |
| Prob > F | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 | |
| R-squared | 0.37 | | 0.38 | | 0.38 | | 0.38 | | 0.38 | |
| N | 1,765 | | 1,761 | | 1,753 | | 1,745 | | 1,734 | |

Note: Robust standard errors are employed.

Being embedded in the neighbourhood (*emb_neigh*) is not significant, while the desire to move out of the neighbourhood (*emb_neigh_contr*) has a larger marginal effect and is consistently significant. This finding suggests that entrepreneurship is indeed perceived as a tool for social and spatial mobility. In addition, the crisis-related variable (*welf_crisiseff*) is found to have a strong positive influence on entrepreneurial intention, that is, worsening financial conditions of the household increase intention. This result adds a further dimension to the social mobility aspect, with regard to the response to economic shocks. Finally, the cultural context-related variables show that the parental (vertical) effect (*parents_trust*) dominates the remaining contextual levels (peers and

neighbourhood). This evidence is consistent with the aforementioned result for *emb_par_intense*, since our OLS results suggest that, among the uncertainty-related individual and contextual variables, vertical transmission of social capital plays the most important role for the student's intention formation. Consequently, the parental contextual level also appears to be the one where the student perceives the highest amount of social capital. The above results remain fairly stable across all our estimations and alternative empirical approaches, suggesting a satisfying accuracy of our conceptual model.

As our next step, we estimate a Logit model using the same explanatory variables and the transformed binary dependent *dum_inten8up*. This model can serve as a test for possible nonlinearities in our specification, as previously discussed. Table 3 presents our results.

Table 3: Model (3), Logit estimation

| Dependent variable: dum_inten8up | Coef. | z–value | Coef. | z–value | Coef. | z–value | Coef. | z–value | Coef. | z–value |
|---|---|---|---|---|---|---|---|---|---|---|
| *female* | 0.023 | 0.20 | 0.056 | 0.49 | 0.073 | 0.63 | 0.039 | 0.34 | 0.092 | 0.78 |
| *age* | 0.032 | 0.40 | 0.058 | 0.72 | 0.057 | 0.71 | 0.039 | 0.49 | 0.068 | 0.83 |
| *hc_avg* | 0.043 | 0.84 | 0.037 | 0.72 | 0.036 | 0.71 | 0.044 | 0.86 | 0.036 | 0.69 |
| *talent* | 0.055 | 0.39 | 0.025 | 0.18 | 0.023 | 0.16 | 0.040 | 0.28 | 0.017 | 0.12 |
| *rent_h* | 0.124 | 0.96 | 0.136 | 1.05 | 0.122 | 0.93 | 0.121 | 0.92 | 0.138 | 1.04 |
| *dum_resources* | 0.344 | 2.81 | 0.357 | 2.91 | 0.355 | 2.87 | 0.353 | 2.85 | 0.367 | 2.95 |
| *feasible_risk* | 0.484 | 16.03 | 0.482 | 15.88 | 0.490 | 15.99 | 0.493 | 15.96 | 0.492 | 15.84 |
| *dum_emb_parents* | –0.307 | –2.21 | –0.294 | –2.12 | –0.330 | –2.36 | –0.335 | –2.39 | –0.335 | –2.38 |
| *emb_par_intense* | 0.094 | 2.72 | 0.081 | 2.32 | 0.080 | 2.30 | 0.097 | 2.78 | 0.081 | 2.31 |
| *emb_neigh* | 0.008 | 0.36 | 0.007 | 0.32 | 0.005 | 0.24 | 0.006 | 0.26 | 0.007 | 0.31 |
| *emb_neigh_control* | 0.039 | 2.05 | 0.039 | 2.03 | 0.035 | 1.84 | 0.042 | 2.17 | 0.037 | 1.89 |
| *emb_fr* | 0.027 | 0.95 | 0.038 | 1.33 | 0.023 | 0.81 | 0.021 | 0.75 | 0.028 | 0.97 |
| *parents_trust* | | | 0.104 | 3.52 | | | | | 0.068 | 2.02 |
| *friends_trust* | | | | | 0.104 | 3.57 | | | 0.080 | 2.41 |
| *neigh_trust* | | | | | | | 0.046 | 1.70 | 0.005 | 0.18 |
| *welf_crisis_effect* | 0.068 | 2.19 | 0.071 | 2.28 | 0.070 | 2.24 | 0.062 | 1.98 | 0.068 | 2.16 |
| Constant | –4.985 | –8.82 | –5.861 | –9.36 | –5.723 | –9.24 | –5.334 | –8.85 | –6.228 | –9.44 |
| Chi-squared | 2 (13) = 403.53 | | 2 (14) = 415.33 | | 2 (14) = 419.99 | | 2 (14) = 413.56 | | 2 (16) = 427.17 | |
| Prob > chi-squared | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 | | 0.0000 | |
| Pseudo-R-squared | 0.17 | | 0.18 | | 0.18 | | 0.18 | | 0.19 | |
| *N* | 1,765 | | 1,761 | | 1,753 | | 1,745 | | 1,734 | |

The results are consistent with the ones of the OLS estimation, with the exception of obedience to parents (*dum_emb_par*) and trust of friends (*friends_trust*), which become statistically significant. Thus, a further indication arises from Table 3, suggesting a role for the contextual peer effect as well in generating stronger entrepreneurial intention. Moreover, the negative effect of *dum_emb_par*,

when interpreted from the point of view of individual and contextual uncertainty, shows that the most entrepreneurially prone students actually tend to be the ones who not only have more intense parental relationships, but also are more independent, that is, the ones with highest freedom from individual uncertainty and who perceive their peers as bestowed in social capital. As a matter of fact, those students who see their peers as more trusting can be thought as the ones who exhibit stronger bridging bonds. It is also noteworthy that in both the OLS and Logit models probabilistic risk evaluation is always highly significant. Its positive sign is also confirming the classical notion of a link between risk-taking attitude and entrepreneurial intention, which we assumed *a priori* worth of empirical testing.

## *6.2 A 3SLS Approach*

As mentioned in Section 5.2, individual contextual uncertainty (till here expressed by *parent_trust*, *friends_trust* and *neigh_trust*) can be approximated by self-reported openness toward adventure (*uncertainty_free*). If the latter variable results in consistent estimation findings and appears to approximate satisfactorily the above contextual levels, using it as an alternative measurement may be justified.

Table 4 presents a reliability test toward expressing the *Context_Uncert* latent factor shown in Model (4) by its proxy *uncertainty_free*. This variable expresses the fast-thinking influence on decisions, which is not probabilistic, unlike analytical risk evaluation (slow thinking). This approximation may allow us to later model recursively our hypothesized multilevel transmission mechanism. Therefore, we substitute in our model the three context-related variables with *uncertainty_free*, and re-estimate our OLS and Logit specifications (column 6 of Tables 2 and 3).

It can be seen in Table 4 that the new estimation results are closely consistent with the ones of Tables 2 and 3. Therefore, the conceptually suitable variable *uncertainty_free* can be accepted as also

statistically suitable for substituting the three levels of contextual uncertainty: parents, peers and neighbours.[13]

Table 4. Model (3), OLS and Logit estimations (uncertainty_free test)

| Dependent variable | entr_inten | | dum_inten8up | |
|---|---|---|---|---|
| | Coef. | t-value | Coef. | z-value |
| uncertainty_free | 0.086 | 3.75 | 0.094 | 3.89 |
| female | −0.063 | −0.63 | 0.017 | 0.15 |
| age | −0.038 | −0.55 | 0.021 | 0.27 |
| hc_avg | 0.025 | 0.58 | 0.042 | 0.82 |
| talent | 0.000 | 0.00 | 0.045 | 0.32 |
| rent_h | −0.127 | −1.18 | 0.093 | 0.71 |
| dum_resources | 0.159 | 1.40 | 0.321 | 2.61 |
| feasible_risk | 0.654 | 24.64 | 0.477 | 15.81 |
| dum_emb_parents | −0.085 | −0.66 | −0.281 | −2.02 |
| emb_par_intense | 0.064 | 1.85 | 0.093 | 2.69 |
| emb_neigh | 0.023 | 1.16 | 0.003 | 0.13 |
| emb_neigh_control | 0.038 | 2.19 | 0.035 | 1.81 |
| emb_fr | 0.008 | 0.31 | 0.006 | 0.22 |
| welf_crisis_effect | 0.069 | 2.29 | 0.062 | 1.98 |
| Constant | 1.513 | 2.95 | −5.323 | −9.20 |
| $F$ or chi-squared | (14, 1744) = 64.98 | | 2 (14) = 415.67 | |
| Prob (or chi-squared) $> F$ | 0.0000 | | 0.0000 | |
| R-squared (or Pseudo-R-squared) | 0.38 | | 0.18 | |
| $N$ | 1,759 | | 1,759 | |

We proceed with operationalizing Model (4), for which results are presented in Table 5. The recursive relationship between the cultural environment (*parents_trust*, *friends_trust* and *neigh_trust*) and *uncertainty_free*, at a first step, and between *uncertainty_free* and entrepreneurial intention (*entr_inten*), at a second stage, justifies the use of a 3SLS approach.[14] In first equation, individual uncertainty is explained by the social capital of the context and family welfare, proxied by home ownership. In the second equation, we estimate our intention model, plugging in *uncertainty_free* as an explanatory variable. The results are fully consistent with regard to all the other main explanatory

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[13] To this regard, we carried out variance inflation factor (VIF) tests as well (not reported), which showed that no relevant multicollinearity issues concerning the three contextual level variables exist in an OLS regression setting.

[14] We tested the possibility of instrumenting the 'uncertainty' variable with family- and peers-specific human capital, which are standard instruments for modelling vertical transmission. However, 2SLS results suggested that these instruments were weak. Consequently, no evidence based on 2SLS is presented here.

variables. In particular, we find again, as statistically significant, the slow-thinking-related risk-evaluation of feasibility (*feasibility_risk*) and the variable related to the effect of the economic crisis (*welf_crisiseff*), which were seen among the main determinants of the model in the above OLS and Logit estimations. We are now able, after taking endogeneity into account, to identify a positive effect of the embeddedness with parents (*dum_emb_parents*) as well.

Table 5. Model (4), 3SLS estimation

| Dep. var.: *uncertainty_free* | Coef. | *z*-value | Coef. | *z*-value | Coef. | *z*-value | Coef. | *z*-value |
|---|---|---|---|---|---|---|---|---|
| parents_trust | 0.060 | 2.13 | | | | | 0.043 | 1.40 |
| friends_trust | | | 0.065 | 2.31 | | | 0.032 | 1.02 |
| neigh_trust | | | | | 0.100 | 3.76 | 0.070 | 2.51 |
| rent_h | 0.260 | 1.96 | 0.267 | 2.01 | 0.273 | 2.05 | 0.267 | 2.00 |
| Constant | 5.467 | 16.78 | 5.461 | 17.25 | 5.258 | 17.68 | 4.892 | 13.46 |
| Parameters | 2 | | 2 | | 2 | | 4 | |
| RMSE | 2.446 | | 2.440 | | 2.439 | | 2.438 | |
| R-squared | 0.00 | | 0.01 | | 0.01 | | 0.01 | |
| Chi-squared | 8.53 | | 9.41 | | 18.3 | | 20.03 | |
| *P* | 0.014 | | 0.009 | | 0.000 | | 0.001 | |
| Dep. var.: *entr_inten* | Coef. | *z*-value | Coef. | *z*-value | Coef. | *z*-value | Coef. | *z*-value |
| uncertainty_free | 0.907 | 2.96 | 0.592 | 2.00 | 0.089 | 0.44 | 0.388 | 2.24 |
| female | –0.061 | –0.59 | –0.051 | –0.51 | –0.041 | –0.41 | –0.037 | –0.37 |
| age | –0.051 | –0.68 | –0.047 | –0.63 | –0.043 | –0.60 | –0.042 | –0.59 |
| hc_avg | 0.025 | 0.54 | 0.022 | 0.49 | 0.008 | 0.18 | 0.011 | 0.25 |
| talent | –0.077 | –0.58 | –0.082 | –0.61 | –0.049 | –0.39 | –0.068 | –0.54 |
| rent_h | –0.359 | –2.03 | –0.282 | –1.71 | –0.125 | –0.94 | –0.203 | –1.53 |
| dum_resources | 0.107 | 0.86 | 0.134 | 1.10 | 0.139 | 1.22 | 0.129 | 1.14 |
| feasible_risk | 0.626 | 18.68 | 0.644 | 20.06 | 0.659 | 24.05 | 0.650 | 25.03 |
| dum_emb_parents | 0.087 | 2.84 | 0.101 | 3.34 | 0.118 | 3.95 | 0.109 | 3.59 |
| emb_par_intense | 0.026 | 0.95 | 0.021 | 0.80 | 0.022 | 0.85 | 0.021 | 0.79 |
| emb_neigh | 0.007 | 0.26 | 0.011 | 0.40 | 0.021 | 0.93 | 0.016 | 0.74 |
| emb_neigh_control | 0.020 | 0.75 | 0.027 | 1.04 | 0.039 | 1.79 | 0.035 | 1.71 |
| emb_fr | –0.044 | –0.62 | –0.026 | –0.39 | –0.004 | –0.07 | –0.017 | –0.39 |
| welf_crisiseff | 0.061 | 2.04 | 0.064 | 2.17 | 0.066 | 2.42 | 0.064 | 2.36 |
| Constant | –3.163 | –2.67 | –1.637 | –1.45 | 0.913 | 1.10 | –0.625 | –0.82 |
| Parameters | 14 | | 14 | | 14 | | 14 | |
| RMSE | 2.811 | | 2.335 | | 1.986 | | 2.121 | |
| R-squared | –0.22 | | 0.16 | | 0.39 | | 0.31 | |
| Chi-squared | 1296.44 | | 1232.4 | | 1096.2 | | 1170.96 | |
| *P* | 0.000 | | 0.000 | | 0.000 | | 0.000 | |
| *N* | 1,750 | | 1,744 | | 1,734 | | 1,725 | |

In addition, with regard to the first equation results, we observe, in Table 5, that the local neighbourhood context (*neigh_trust*) is the strongest determinant of students' uncertainty, supporting our expectation that the general cultural context is a source of endogeneity before vertical and horizontal transmission. Finally, in the second equation, we note that the effect on *uncertainty_free* from the local cultural context is positive, and individuals who are freer from uncertainty are more prone to entrepreneurship. This means that if a city or a neighbourhood has higher social capital, this will mean less uncertainty in the individuals and stronger proneness towards entrepreneurship, indifferently of the vertical and the horizontal transmissions. Still, it should be noted that, in our estimates, vertical transmission is always stronger than the horizontal one.

In summary, we find empirical evidence to claim that the family and the personal networks impact entrepreneurial intention formation (especially when referring to high intention). However, this formation is also endogenously dependent on the overall local cultural context, which determines the general personal feeling of uncertainty of all individuals (students, their parents and their peers, and the neighbours). Thus, we fail to reject our main working hypothesis that it is not only the personal characteristics and networks, but the overall institutional (in formal and informal sense) environment as well which drives entrepreneurial propensity through uncertainty.

## 7 Conclusions

In this paper, we modelled the formation of entrepreneurial intention of adolescents as a function of different levels of personal and contextual uncertainty. In particular, the cultural endogeneity of social capital transmission was analysed by means of a three-stage least squares (3SLS) framework. Data from a unique survey of second-year high school students in the city of Palermo, Italy are used for empirical testing.

Our analyses lead to several main findings. In general, we find that the economic feasibility (as risk-evaluation) of an entrepreneurial idea exerts a strong impact on students' intention to become

entrepreneurs. Primarily, it is the embeddedness in the relationship with the parents that fosters intention formation. The effect of peers on intention toward entrepreneurship, mostly relevant for developing strong intention, is only secondary in magnitude. When treated for endogeneity, the model reports strong effects from the neighbourhood's social capital context. Entrepreneurship is confirmed to be perceived as a tool for social and spatial mobility, and as a way out of adverse economic conditions. We also find clear indications that one's feeling of uncertainty plays a role in determining intention, and that the former is in turn largely determined by the level of local social capital. This means that, if high local social capital exists in a place, this might influence positively local entrepreneurship levels, as result of vertical and horizontal transmission. The opposite holds true for low social capital levels.

Furthermore, on a conceptual level, our results give the following indications. First, they suggest that there are two significant components driving the impact of the cultural dimension on adolescents' intention formation: individual uncertainty, and contextual uncertainty. Second, these theoretically different levels of proximity in one's environment – the parental level of the context (bonding relationships), the peers' network, and the neighbours' network (two types of bridging relationships) – differ in their relevance to individual intention. The formation of entrepreneurial intention seems most strongly impacted by the vertical transmission of social capital (between parents and students), which is always significant through all our empirical specifications. Yet, when we consider the segment of students which have stronger intention, we see peer effects starting to play a significant role as well. This finding has a double message: the peers' social capital matters the most in leading to strong intention, and more entrepreneurially-prone students might perceive their peers as more trusting.

To disentangle endogeneity and avoid reverse causality, we employed a 3SLS approach, which allows to handle this issue, and to come to a third conceptually-relevant finding: contextual uncertainty as a factor for one's intention formation is *a priori* shaped by one's cultural environment (i.e., indifferently of our networking pro-activeness and depending on the social capital characteristics

of people in our networks). Most importantly, we see that the general context (the neighbours level) is what drives it the most. With regard, instead, to individual uncertainty, it still remains most strongly associated with parental influence, suggesting that vertical transmission is the most important mechanism for intention formation. The dominance of the neighbourhood level on other types of influences as an early shaper of individual uncertainty deserves further investigation, and will be the subject of future research.

These conceptual conclusions, interpreted from Kahneman's (2011) fast- and slow-thinking perspective, suggest that entrepreneurial intention in adolescents is shaped under a fast-thinking process mediated by parental education. And it is eventually toward high intention that the peers may matter as a source for horizontal transmission through slow-thinking. The whole intention formation process thus seems primarily enveloped in a causal way in the innate fast-thinking dependence of individuals on the common local culture.

Last but not least, as the questionnaire on which our research is based is collected in 2015, immediately after the great recession, and we find a positive effect on intention from a worsening of household economic conditions. This suggests that, among adolescents in our sample, the crisis might have led to a general increase of the intention toward entrepreneurship. This indication for a possible nonlinear change of entrepreneurial intention in times of economic crisis is known as cultural hysteresis (see Tubadji et al. 2016).

With regard to the limitations of this study, it should be acknowledged that our data provide only self-reported assessments of trust, this being an especially sensitive issue when we attempt to quantify the objective level of social and cultural capital of the interviewees' neighbours. Possible distortions due to this data limitation can be cross-checked under the condition of availability of self-reported information from the neighbours themselves (which was not possible to collect) or another unbiased measure of the neighbours' social capital. With such better quantification, the clear endogenous mechanism modelled here can be re-examined. Additionally, the use of 2SLS instead of 3SLS with better performing instrumental variables could provide further corroboration of the results, leading to

a possible extension of the current analysis. Finally, the availability of longitudinal data (e.g., from repeating the survey at regular intervals), would allow expanding our research questions to the study of dynamics in the formation of entrepreneurial intention, and to the role of change in economic conditions and networks.

## Acknowledgements

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# Appendix 1. Description of Variables and Related Questionnaire Items

Our dependent variable – entrepreneurial intention (*EI*) – is quantified on the basis of question 199 from the questionnaire, which asks how attractive one finds, on a scale from 1 to 10 (where 10 is the highest level of desirability) the idea of having her own business. We first use this variable (*entr_inten*) in its raw format. However, in order to bring the economic interpretation of this variable closer to the actual economic choice that can be expected from the students, we transform the variable into a binary one, which is equal to 1 for all answers in the range from 8 to 10 (stronger intention). We label this variable as *dum_inten8up*.

The capital necessary for investment in entrepreneurship as a determinant of intention [element *Z* in Models (3) and (4)] is quantified with two variables from the questionnaire, regarding the family wealth status and the actual resources needed for undertaking entrepreneurship. Namely, we use question 196, answering the question if the family house is rented or owned. This datum informs our variable *rent_h*, which is equal to 1 if the house is rented. Secondly, we use question 203, which infers what type of resources one will use in case she considers to start a business, the answers being: (i) personal resources, (ii) co-financing with others, (iii) borrowing from friends and family, or (iv) external resources such as banks or venture capital. We transform these data into a categorical

variable, taking value 1 when personal resources are indicated, and 0 otherwise. This variable is labelled *dum_resources*.

The model component *Feasibility_risk* is quantified in our data set through question 200, which answers the query how feasible one finds the idea to have her own business. This question straightforward inquires feasibility, but as pointed out by Kahneman (2011), feasibility is a perception formed in a slow-thinking analytical manner. Indeed, it is not a fast-thinking-triggered perception, but, as long as feasibility is self-reported, it can qualify only as a measure of a probabilistic sense of likelihood.

On the other hand, fast thinking is driven, according to our model, by uncertainty. We take into account two types of uncertainty – individual (*Indiv_Uncert*) and contextual (*Context_Uncert*). Several variables can be used to quantify each of these aspects. First, we use variables at the parental, peers and neighbours level for both individual and contextual uncertainty. Second, we employ a proxy for contextual uncertainty, which we use in our recursive model. *Indiv_Uncert* is then quantified as the level of individual embeddedness in one's context, that is: *emb_par_intense*, based on question 169 (How many hours per day parents spend helping the student with her homework); *emb_fr*, based on question 143 (How many times per week one meets her friends outside of school); and *emb_neigh*, based on question 128 (How much free time one spends in her own neighbourhood). *Context_Uncert* is approximated by *uncertainty_free*, based on question 154, dealing with how close one finds herself to a person who is willing to take a risk and get involved in adventures. *Context_Culture*, instead, makes use of the same three levels used for *Indiv_Uncert*: *parents_trust*, based on question 34 (How important is caution in trusting people for the interviewee's parents); *friends_trust*, based on question 52 (How important is caution in trusting people for the interviewee's friends); and *neigh_trust*, based on question 59 (How cautious are people in the interviewee's neighbourhood in trusting people). In fact, the global factor *Indiv_Uncert* is the level to which one is susceptible to the context, while the global factor *Context_Uncert* is the degree of social capital one has access/exposure to as a surrounding context on the three levels: parents, peers and neighbours.

Standard personal and socio-demographic controls are available from the questionnaire as well. These are: *male* (question 1, coded as a binary variable equal to 1 when the indicated gender is male); *age* (question 2, taking values from 13 to 17, and '17 or more'); *yearIT*, collecting possible past migration information (question 3, giving classes of years of residence in the country); *hc_avg*, a human capital proxy (question 167, asking the student's average grade from the previous year, and ranging from 3 to 10); and *talent*, based on question 163 (asking student's preferred subject between Italian, mathematics, foreign languages and others). The latter variable is recoded as a binary variable equal to 1 for mathematics and 0 for else.

An additional set of control variables includes: (i) the self-assessed quality of the relationship with parents *dum_emb_par* (question 211, about how important parental obedience is to the interviewee), taken as a proxy for family embeddedness, and equal to 1 when the interviewee indicates easy interaction and comfort in dependency from parents, and to 0 when difficult relationships emerge; (ii) *emb_neigh_contr*, a proxy for quality of neighbourhood (question 132, inquiring if the student would prefer to live in a different neighbourhood); (iii) *welf_crisiseff*, collecting information about a possible role of the economic crisis (question 198, asking to which degree the economic situation of the student's family has improved or worsened).

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