

Family Firm Connections and Entrepreneurial Human Capital in the Process of Development*

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Abstract

In this paper we present a new theory accounting for the heterogeneous impact of family firms on economic growth. We develop an overlapping generations model, where agents are heterogeneous in innate talent, and family firms have access to an additional source of managerial capital, family connections, which affects the incentives of the firms' owners to pass on the company within the family and invest in the entrepreneurial human capital of their heirs. Our theory predicts that family firms cluster into heterogeneous groups with different management practices, inducing, at the aggregate level, a misallocation of talent that affects economic growth and the evolution into either a dynamic or a stagnant society, depending on the productivity of family connections in doing business. This heterogeneity in management practices and entrepreneurial human capital explains the different contribution of family firms during industrialization, highlighting the many possible evolutionary patterns for the economy and long-run growth regimes. Consistent with the theory, we provide empirical evidence in favor of the importance of social connectivity among individuals for explaining the difference in management practices between family and non-family firms, and, in turn, the GDP per-capita across countries.

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1 Introduction

According to a well-established tradition in business history and economics, the family firm, the firm owned and controlled by the family's descendants¹, is a crucial source of dynamism and progress in the early stages of industrialization, becoming a source of conservatism, cronyism and economic decline in the stages of mature development (Mathias and Postan, 1978; Pollak, 1980; Bertrand and Schoar, 2006). At the beginning of the industrialization process, when markets are largely incomplete and institutions are untrustworthy, the family proves to be the appropriate unit around which to organize business activity, allowing information and incentive problems to be minimized without being an impediment to the emergence of entrepreneurial talent, firm entry or economic progress². As the industry grows, the social and economic institutions of the economy strengthen, thereby making the substitution role of kinship less important. Concurrently, the firm's organization develops into an ever more complex, professional affair, for which the existing talents within the family are often inadequate, and incompatible with dynastic motivations that typically drive succession in family firms³. At this stage, in countries where family businesses retain their predominant role in economic and social life, the economy tends to degenerate into cronyism, producing a misallocation of entrepreneurial talent, hindrance to technological innovations and a barrier to social mobility – as occurred, for example, in France throughout the nineteenth century, in Britain between the nineteenth and twentieth centuries, or in Italy at the end of the twentieth century (Landes, 1949; Elbaum and Lazonick, 1986; Chandler, 1990; Amatori, 1997).

Although persuasive and in some cases accurately representing the evolution of family firms, this view overlooks the heterogeneity of family firms in terms of management practices (Pérez-González, 2006; Bloom and Van Reenen, 2007; Chung and Luo, 2013), and the influence that this heterogeneity exerts on technological progress and economic development (Blackford, 2008). More basically, the classic boost-retardation story of family firms fails to appreciate the importance of the social, cultural and institutional context in determining the heterogeneous distribution of talent and quality of management practices across family firms, and, in turn, the different evolutionary patterns that the family firms

¹A general consensus exists in business history and management studies that keeping possession of the ownership and control of the business within the family are the distinctive elements of family firms (Litz, 1995; Colli, 2003). However, this definition has been criticized for juxtaposing firms at the first with firms at the second and later generations (Bertrand and Schoar, 2006). Following Morikawa (2001), in this paper we limit the notion of family firms to those firms owned and managed by the founder's heirs, while we will use the term individual firms for firms at the first generation.

²Quoting from Kocka (1981, p. 54): “family structures, processes and resources furthered the breakthrough of industrial capitalism and helped to solve problems of (capitalist) industrialization which could hardly have been solved otherwise”; and from Payne (1984, p. 188): “there can be little doubt that the family firm was the vehicle whereby the Industrial Revolution was accomplished”. For economists, see Bhattacharya and Ravikumar (2001), Chami (2001) and Burkart et al. (2003).

³An oft-quoted, vivid image of the damage produced by *entrepreneurship by inheritance* was given by the American financier Warren Buffet according to whom “[to] pass down the ability to command the resources of the nation based on heredity rather than merit ... [is like] choosing the 2020 Olympic team by picking the eldest sons of the gold-medalwinners in the 2000 Olympics” (reported in the *New York Times* article “Dozens of the wealthy join to fight estate tax repeal”, 14 Feb., 2001, electronic edition).

can follow in the industrialization process, convincingly emphasized by recent studies in comparative business history (Colli and Rose, 2003; Blackford, 2008; Colli, 2012).

In this paper, we investigate the mutual action between the accumulation of entrepreneurial human capital and the quality of management practices in the family business sector, its incidence in the industry and the growth of the aggregate technology and economy. We present a new theory that accounts for the heterogeneous impact of family firms on economic growth, according to whether they invest resources in the entrepreneurial human capital of the company's leaders, or whether they rely on crony management practices largely based on the web of economic, social and political connections built by past generations of family entrepreneurs. In turn, the incentive to keep the firm within the family, the type of management practices to use and the degree of social mobility are all affected by the pace at which aggregate technology develops as well as the socio-cultural context in which the firm operates. From these complex interactions, there emerge many possible evolutionary patterns for the economy and long-run growth regimes, returning an image of the role of family firms in the industrialization process that is much more varied than what the traditional boost-retardation thesis suggests.

In detail, we consider a Lucas (1978) overlapping generations economy where firms are operated by a single manager and individuals have to decide whether to allocate their heterogeneous innate talent to managing an enterprise or working as an employee. The final output is produced by using managerial and general human capital. Managerial capital is shaped by two sources: the entrepreneurial human capital of the firm leader and the web of social, economic and political connections of the family to which he/she belongs. The entrepreneurial human capital is influenced by the individuals' innate ability and the education provided by their parents. By contrast, family connections can be established only by firms already in operation, as we assume that they are family-specific, and are less responsive to the innate ability of the heirs. The "productivity" of family connections is determined by the importance that society attributes to interpersonal relationships and contacts in business life. This, in turn, is determined by a stable component that captures the slow-moving elements of the social, cultural and institutional structure of the economy and by an erosion effect à la Galor and Tsiddon (1997), shaped by the degree of technological dynamism of the economy: when the latter is high, the prominence of relationships in business life weakens, the social connections built by the parents in the past are more likely to become obsolete and their transfer across generations is less productive.

In such an economy, the allocation of individuals' talent, the evolution of family firms in the process of development and the steady-state growth rate depend on the relative productivity of entrepreneurial human capital and family connections in managing firms successfully. If the socio-cultural and technological environments in which firms operate render the contribution of family connections to firm profitability only moderate, an *entrepreneurial society* emerges in which family firms thrive without impeding the formation of new enterprises, social mobility or progress of the economy. In this regime there prevails a polarization of family firms into two groups using different management practices. One

group is conducted by highly talented descendants, who make use of management practices based on entrepreneurial human capital and exhibit high financial performance. In the other group, the firm's control is left by parent entrepreneurs to the least talented heirs who, relying on the web of connections built by the family, gain a profit higher than the wage they could alternatively obtain by participating in the labor market. On the other hand, since the workers' descendants cannot rely on the web of connections established in the past by their parents, only the most talented individuals found new enterprises, by using entrepreneurial management practices. As a result, in equilibrium, there is no difference in the quality of management and profitability between family and non-family firms operated by highly educated entrepreneurs at the top tail of the talent distribution. However, at the aggregate level, family connections lower the average performance of family firms, allowing a mass of low-ability heirs to continue doing business. Eventually, if the family connections are extremely productive, the economy will end up in an immobile, *crony society* where the descendants of workers will be workers and the descendants of entrepreneurs will be entrepreneurs, managing the family firm by exploiting the social and political contacts inherited by their parents.

The allocation of talent across the two types of managerial capital, induced by the productivity of family connections, produces aggregate economic inefficiencies. Assuming that the growth rate of the aggregate technology depends on the entrepreneurial human capital in the economy (Galor and Moav, 2000; Acemoglu et al., 2006; Gennaioli et al., 2013; Doepke and Zilibotti, 2014), we show that the steady state growth rate of the economy is negatively affected by the productivity of family connections. In the extreme case of the crony society, the growth rate of the economy is zero due to the lack of educated entrepreneurs and, unless major changes in the socio-cultural structure of society drastically reduce the productivity of family connections, it is blocked in this stagnant, no-mobility equilibrium.

Besides the different possible steady state regimes, the mutual relationship between the productivity of management practices and economic growth helps to explain the variety of evolutionary patterns that family firms may follow during the process of development documented by the historical research. To begin with, we may have the evolution of family firms from entrepreneurial dynamism to cronyism and dynastic control, of the kind emphasized by the classic boost-retardation approach (Landes, 1949; Chandler, 1990; Lazear, 1991). In the initial stages of development the economy is characterized by the presence of few, efficient family firms, using entrepreneurial human capital and sustaining high growth rates. However, as industrialization proceeds, the number of firms and market wage rate increase, thus slowing the speed of technology innovation. This leads to a rise in the share of family firms relying on family connections and crony management practices. The degree of cronyism resulting from family firms in mature stages of development depends on the importance that the socio-cultural environment in which companies operate attributes to social, economic and political connections for doing business (Colli, 2003). At one extreme, where family connections are unproductive, family firms as a whole

cannot be considered an impediment to growth. At the other extreme, where the social structure of the economy is strongly favorable to the productivity of family connections, the economy may experience an endogenous transition from an entrepreneurial, dynamic regime to a crony, stagnant regime.

Different transitional dynamics emerge when the initial stages of development are characterized by the presence of a large number of small, bad managed family firms. If the socio-cultural and institutional structure of society strongly support the productivity of connections, the economy can be blocked in a stagnant or low-growth equilibrium in the long run (Amatori, 1997; Aganin and Volpin, 2007). In this case, family connections can sustain the aggregate income in the short run, but this happens at the cost of blocking the transition to an entrepreneurial society and long-run growth. In contrast, if the socio-cultural structure of society is such that family connections are not invariably the best way to conduct business, the economy can experience an industrial and managerial take-off (Nye, 1987). As industrialization proceeds, some family firms are replaced by new, more efficient entrants which adopt entrepreneurial management practices, while some of the surviving family firms become themselves more efficient by intensifying the use of entrepreneurial human capital. This pushes up the growth rate of the economy, thus further reducing the importance of family connections in business life and raising the importance of entrepreneurial human capital (Mokyr, 2002; Squicciarini and Voigtländer, 2014).

Four major implications follow from the theory. First, family (inherited) firms are managed, on average, worse than non-family firms. Second, this gap is greater in a society whose socio-cultural structure supports “collectivist” values and the productivity of social connections. Third, the family firms that rely on entrepreneurial human capital of their leader for managing the business are equally productive and well-managed than non-family firms. Finally, higher steady state growth rates and per capita income levels are associated to large numbers of family firms using entrepreneurial human capital. In the last section, we provide robust evidence in favor of these four predictions. In particular, using data from the World Management Survey (Bloom et al., 2012a) we find that: (i) there is a negative gap in the quality of management practices between family and non-family firms, (ii) the gap is higher in countries where the importance of social connections (as measured by the Hofstede Individualism Index) in the local culture is high, while it disappears in individualistic societies such as Australia, the UK and the USA; (iii) the gap is entirely ascribable to the group of family firms which rely more strongly on family connections; (iv) at the aggregate level, there is a positive correlation between the per capita GDP and the average quality of predicted management practices, even after controlling for several proximate causes of development and cultural variables.

This paper is primarily related to three strands of literature. First, we contribute to the macroeconomic literature on the consequences of talent allocation and accumulation of entrepreneurial human capital (Doepke and Zilibotti, 2014), being closest in particular to Hassler and Mora (2000), Caselli and Gennaioli (2013) and Lindner and Strulik (2014).

Hassler and Mora (2000) assume that the children of entrepreneurs have an exogenously given information advantage in managing firms with respect to workers' descendants. As a result, in technologically stagnant economies, where the nature of entrepreneurial tasks changes slowly, this information advantage is sufficiently rewarding to allow low-ability entrepreneurs' descendants to exploit their parental background and start a firm with negative feedback on technological innovation and economic growth. Caselli and Gennaioli (2013) investigate the macroeconomic consequences of the succession of firm ownership and control from one generation to the next, when entrepreneurial skills are partly inherited and credit market imperfections keep untalented heirs in business. Lindner and Strulik (2014) analyze the interaction between economic development and network formation in a network-based theory of economic growth, when credit market imperfection distorts the matching between potential investors and entrepreneurs. They show that, during the modernization process, only strong formal institutions may allow a process of gradual take-off to perpetual growth, by counterbalancing the deterioration of the informal norms generated by the decay of the local connectivity across individuals.

Unlike these papers, we abstract from credit market imperfections, while stressing the family firms' privileged access to a specific factor of production, the family's social and political connections, which induces parent entrepreneurs to hand down the company within the family also to the least talented heirs and to adopt bad management practices. In this context, we derive a dynamic general equilibrium with a continuous, rather than two types, distribution of entrepreneurial talent to study how the misallocation induced by family connections evolves during the development process and influences long-run growth. Our transitional analysis also stresses the role of family connections in explaining the endogenous transition of dynamic societies into crony immobile ones, managerial take-off and long-run development reversal.

Our result of talent polarization also contributes to the literature on family firms (Bhattacharya and Ravikumar, 2001; Burkart et al., 2003; Chami, 2001). These studies analyze the persistence of family firms as the result of amenity potential, financial market imperfections and agency problems, which make the leaving of the leadership to the descendants an inefficiently high profitable alternative to selling the firm or hiring an external manager. We identify a general equilibrium effect of family connections on the intergenerational transmission of family firms working through the labor market affecting not only the total number of family firms but also the distribution of their quality in terms of management practices and leadership talent.

Finally, our empirical analysis of the relation between the degree of individualism in the society and the managerial gap between family and non-family firms contributes to the growing literature on social ties, firm performance and economic development (Alesina and Giuliano, 2014; Burchardi and Hassan, 2013; Dittmar, 2013). Closest to the spirit of our paper, Bloom et al. (2012b) document that social trust influences the organization of firms by allowing a high degree of decentralization of decisions within the company. At a macro level, Gorodnichenko and Roland (2010) and Fogli and Veldkamp (2012) find

that the degree of (Hofstede) individualism in the society is positively correlated with the country’s rate of technology diffusion and economic growth. Our findings showing that the managerial quality gap between family and non-family firms decreases in the degree of individualism of the societies shed new lights on the underlying determinants of the social structure and development nexus (Ashraf and Galor, 2011).

The rest of the paper is organized as follows. Section 2 presents the historical and empirical evidence on the performance of family firms and the role of family connections motivating our theory. After presenting the basic structure of the model in Section 3, in Section 4 we analyze the occupational and managerial choices. Section 5 characterizes the distribution of family firms and the aggregate equilibrium when the growth rate of technology is exogenous. Section 6 analyzes the macroeconomic effects of family firms and of the distribution of the entrepreneurial human capital once their feedback effects into the economic growth are taken into account. In Section 7 we test the model’s main predictions. In Section 8 we discuss a number of theoretical robustness checks and extensions. The last Section concludes. All the proofs and data details are reported in the Appendix.

2 Family firms and family connections

2.1 Evolution and performance of family firms

There are several pieces of historical and present day evidence that document the importance of family-controlled companies worldwide, regardless of the stage of development of the economy, the heterogeneous evolution of family firms during industrialization, and their capacity to perform similarly or even outperform non-family firms in some circumstances.

On historical grounds, for example, already Gerschenkron (1954), in opposition to Landes (1949) view of the vices of French family capitalism, argued that in France in the 19th century the influence and incidence of family firms were no stronger than in Germany. In the same vein, Church (1993, p. 39) emphatically claims that until the 1940s, “family firms persisted in Germany probably as widely as in Britain, while in Japan the family enterprise based on the holding company structure was even more dominant than in either country”. Accordingly, the predominance of family firms cannot be viewed as a proximate determinant of the industrial rise and decline, but rather it is their heterogeneous capacity to innovate and introduce modern management practices that explains the positive or negative influence of the family businesses on economic development. In fact, in several cases, family firms were able to keep up with organizational and technological changes by professionalizing family descendants through rigorous routes of formal training and practical experiences. Fitzgerald (1995, pp. 42-43), for example, revisiting on the cases of the two British food companies Cadbury and Rowntree singled out by Chandler (1990) as emblematic representations of the managerial failure of family capitalism, concludes that “there is no indication that Cadbury suffered from a lack of capital or managerial talent,

despite remaining a family concern. ... As far as Cadbury's great competitor and fellow Quaker firm Rowntree is concerned, managerial failure is even less likely"⁴.

In this perspective, the family firm did not follow any single evolutionary pattern during the industrialization process. In some cases, industrialization starts with a large troop of small-sized, non-entrepreneurial family firms, mainly exploiting community and kinship relations. This, for example, occurred in Britain at the end of the eighteenth century (Rose, 2000; Blackford, 2008), where the evolution of family firms took place in a volatile environment with many firms exiting the market substituted by more efficient entrants⁵. In Italy as well, small family firms were the largely predominant form of enterprise in the early stage of industrialization. Many of these, however, could survive and thrive only by nurturing a dense network of social, economic and political connections, at the risk of leading in the long run to a blocked, socially immobile society (Amatori, 1997; Aganin and Volpin, 2007). Other times, family firms were bigger and entrepreneurially managed right from the initial phases of industrialization, like in Germany or Japan, in some cases continuing to invest in innovation and entrepreneurial human capital even in the mature stages of industrialization, in others shifting the major source of their competitive advantage on the network of social and political connections (Kocka, 1981; Morikawa, 2001; Blackford, 2008). In the light of the many evolutionary patterns of family firms and the existence of stories of business success and decline in countries dominated by family firms, many historians have suggested viewing the different cultural, social and institutional environment in which family firms are embedded as the key factor to understand "national differences in the capabilities and behavior of family firms [and] the distinctive characteristics of personal capitalism" (Colli and Rose, 2003, p. 341).

The present-day figures on business ownership and performance return an image of family firms which is no more clear-cut than for the past. First, the family-controlled firm is a common form of business organization even among publicly listed companies of well developed countries. In the United States, in the mid-1990s, four out of the top 20 listed companies by market capitalization and one third of companies included in "Standard & Poor 500" and "Fortune 500" indexes had a family as ultimate controlling owner (La Porta et al., 1999; Anderson and Reeb, 2007). In the same years in Europe, 24% of listed companies in the UK were controlled by families, 60% in Italy and 65% in France and Germany (Faccio and Lang, 2002), while in eastern Asian countries the share of family-controlled firms was typically above 50% (Claessens et al., 2000).

⁴According to Fernández Pérez and Puig Raposo (2007, p. 480), in Spain family firms promoted the foundation of private business schools like ESADE and IESE in Barcelona as a "strategy to get professional managers among the family members of big family firms" (see also Chadeau, 1995; Colli, 2012).

⁵According to Blackford (2008, p. 63), "small family firms, usually organized as single-owner proprietorships or partnerships, accounted for most of Great Britain's industrial and economic growth during eighteenth and nineteenth centuries. Their development took place in a volatile business environment, with many firms failing each year, only to be replaced by new ventures. ... In the eighteenth century some 33,000 businesses declared bankruptcy in Great Britain ... Britain's national income rose 0.87 percent annually, but the number of bankrupt firms climbed 1.15 percent per year. Moreover, rates of bankruptcy rose considerably in the mid and late 1700s, as the industrialization sped up".

Second, the extant empirical evidence does not unambiguously support the prediction that family firms underperform relative to non-family firms⁶. What is more interesting, the impact of family ownership on the firm’s performance is not uniform. [Pérez-González \(2006\)](#) considers a sample of 335 successions in publicly traded family-controlled US firms, finding that companies run by a family heir have a lower ROA during the three years after the succession. However, the underperformance disappears if the family CEO has accumulated enough human capital by attending a selective college. [Bloom and Van Reenen \(2007\)](#) look at the management practices across a sample of 732 firms in France, Germany, the UK and the US, showing that the worse management practices of family firms can be traced back to the influence of the primogeniture tradition in the society, under which the eldest heirs become the CEOs of the company, regardless of their abilities.

2.2 Family connections

The central role of social, economic and political connections in conducting the family business and making it successful is widely recognized in historical, sociological, management and economic research. As will be made explicit in the next Section, our analysis rests on four major features of family connections whose real-world significance finds clear support in anecdotal and empirical evidence.

First, connections are more valuable for entrepreneurial than working activity, and they can be built during the firm’s lifetime and bequeathed to successive generations. According to the social embeddedness theory, business organizations are embedded in webs of social, political and economic relations, strongly influencing access to information and resources, and economic performance ([Granovetter, 1985](#); [Uzzi, 1996](#)). From this standpoint, many studies have underlined the crucial importance of the interpersonal ties between the family members and individuals outside the family to have special access to resources that such individuals control and make the family business successful. For example, [Rose \(2000\)](#) reports that family-based relationships, in some cases promoted or cemented by arranged marriages, lay at the root of the success of the cotton industrial district in Lancashire during the eighteenth and nineteenth centuries. [Braggion \(2011\)](#) documents that in the nineteenth century, small (family) British companies whose managers were affiliated with Freemasonry had easier access to credit. In the same vein, the prosperity of Italian industrial districts in the second half of the twentieth century or the commercial success of overseas Chinese family businesses were based on a system of shared, family-oriented cultural values producing a web of social and interpersonal connections among entrepreneurs and their families ([Dei Ottati, 1994](#); [Peng and Luo, 2001](#)). Finally, [Mehrotra et al. \(2010\)](#) find that family firms are less predominant in countries where arranged marriage norms are less widespread.

⁶With regard to the US, [Anderson and Reeb \(2007\)](#) find that on average family firms overperform in terms of ROA and Tobin’s q , while [Villalonga and Amit \(2006\)](#) find that among the Fortune 500 firms those run by descendant CEOs have a lower market performance. Evidence for other countries is equally mixed ([Morck et al., 2000](#); [Barontini and Caprio, 2006](#); [Bennedsen et al., 2007](#); [Sraa and Thesmar, 2007](#); [Cucculelli and Micucci, 2008](#); [Mehrotra et al., 2013](#)).

Beside the network of business contacts created by social and cultural relationships, interlocking directorships and political connections are other typical forms of ties producing hedges to competition and advantages for family firms. In Italy, for example, the interfirm connections created by individuals sitting on multiple boards of directors have been a fundamental way through which major family businesses, like the Agnelli, Caltagirone, Falck and Pesenti families, formed and nourished their economic power (Rinaldi and Vasta, 2005; Aganin and Volpin, 2007). In emerging markets, like in Western countries, the establishment of political connections is a widespread strategy used by family firms to seize public resources, influence the execution of discretionary charges/rules and avoid expropriations (Amsden, 1997; Fisman, 2001; Ferguson and Voth, 2008; Li et al., 2008; Cingano and Pinotti, 2013). Even in an uncorrupted country like Denmark, family connections with the local political sector appear to be very productive for doing business: doubling the political power of local politicians (measured by the municipality's per elected politician) nearly doubles the operating returns of firms whose CEOs and directors have family connections with the same politicians (Amore and Bennedsen, 2013).

Second, building a network of connections is an explicit strategy to create value for the family firm across generations, an alternative to entrepreneurial human capital, requiring investments of time, effort and money in nurturing interpersonal relations. Alfani and Gourdon (2012) mention a number of historical cases and real data concerning the Parisian Protestant and Jewish economic elites, Swiss cotton entrepreneurs operating in Lombardy (Italy), Icelandic fishermen and Swedish dealers during the nineteenth century, which clearly illustrate the deliberate business use of godparenthood and marriage witnessing made by large and small entrepreneurs to gain access to economic resources and markets. Modern examples of a productive use of social interactions are reported by Salvato and Leif (2008) in a study concerning four family-controlled companies currently in operation in Italy and Switzerland⁷; while Hytten and Marchioni (1970, p. 29), studying the industrialization of Gela, a major industrial hub in southern Italy (Sicily) in the '1960, noted that in this area "the relative success of the individual entrepreneur can be measured not so much in terms of his entrepreneurial ability in the objective sense, but according to his aggressiveness and lack of scruples, to his political and parapolitical support, to the

⁷Here we read, for example, that the Frescobaldi family, one of the largest wine producers (Marchesi de' Frescobaldi) in the Chianti area in Tuscany, has put in a great effort to renew their network of social ties on a continual basis. During the first generation, Lamberto Frescobaldi assumed the posts of president of the main local bank in Florence, head of the local technical school for agronomists and member of the association ("Consorzio") of Chianti producers. "The Frescobaldi family leveraged these interpersonal relations to ease access to valuable resources, such as the acquisition of wine estates from members of the "Consorzio" and privileged access to the best human capital resources from the local technical school. Together, this allowed Frescobaldi to gradually transform its production from low-yield crops to quality wines" (p. 265). During the second generation, Vittorio Frescobaldi became the president of the "Consorzio" while his wife Bona cultivated a large network of social relations which led her to be, "together with Giorgio Armani [the founder of another well known Italian family firm] ... the only Italian invited to Prince Charles' wedding in England" (p. 268). During the third generation, the Frescobaldi family connections were further revived by the relationships built by Lamberto during his studies at the University of California at Davis thanks to which he gained contacts around the world: "when I am in South Africa, California or Chile – Lamberto Frescobaldi reveals – I always find somebody who studied at Davis. It's a community, a club" (p. 268).

links of friendships and trust that he is able to build with key-actors of the contracting firm”.

Third, the web of contacts built by the family firm’s founder and his successors pertains to the family more than to the firm, and it can be transmitted across generations but not to unrelated people outside the family. This assumption finds corroboration in a recent study by [Chung and Luo \(2013\)](#). They look at the ROA of Taiwanese listed firms, finding that firms which appoint a new CEO external to both the firm and the controlling family strongly improve their performance during the two years after the succession only if the share of family ownership is low. By contrast, family ownership tends to be beneficial when the successor is a family member. In view of these findings, [Chung and Luo \(2013, p. 339\)](#) conclude that “successors who are well connected and perceived as legitimate may be more effective in acquiring resources, minimizing transaction costs, thus facilitating firm performance. ... For firms embedded in ... social relationships, family ... successors will be at an advantage in accessing network resources”.

Finally, while the entrepreneurial ability of the descendants has an obvious impact on the performance of family firms, the value created by the web of family connections is less sensitive to the identity and talent of the successor. Here the words of Aldo Fumagalli, a third-generation CEO of an Italian family firm interviewed by [Andrea Colli \(2012, p. 252-3\)](#), are unequivocal:

the most important thing my father passed on to me was not the company in itself, nor its financial good shape, nor the money and capital, nor even the business idea, which we (my brother and I) have now completely changed. The most important thing he gave us was the reputation of the company, and with the reputation, contacts and personal relationships. In this kind of business, everything is customized, and good relationships, contacts and reputation are indispensable. I work with many customers that my father, or even my grandfather, served. We, the third generation, now serve their third generation.

3 Model setup

Let us consider an overlapping generations economy in which economic activity extends over infinite discrete time. In each period t , a generation, populated by a continuum of individuals of measure one, is born. Individuals differ in their innate abilities, which are uniformly distributed over the unit interval, $a_t^i \sim U[0, 1]$.

Each individual has a single parent and a single child such that population is constant across generations. Individuals live for two periods and in each period of their life they are endowed with one unit of time. In the first period (childhood), they spend the unit of time acquiring either the managerial capital required to run a firm or general human capital that can be supplied on the labor market. In the second period of their life

(adulthood/parenthood), individuals allocate their endowment of time between working for or managing a firm, according to the type of competences accumulated in childhood, and building up the managerial and human capital of their children. Correspondingly, in adulthood individuals gain a payoff (profit or wage) and consume.

3.1 Production

The economy is composed by a fringe of competitive firms that produce a single homogeneous good. Firms are operated by a single manager, who is also the owner⁸, employing efficiency units of general human capital and managerial capital as inputs of the production process:

$$y_t^i = A_t m_t^i (H_t^i)^{1-\alpha}, \quad (1)$$

where m_t^i indicates the managerial capital of the firm i , H_t^i the quantity of efficiency units of human capital employed in firm i , A_t the aggregate technology of the economy and $\alpha \in (0, 1)$ ⁹.

At the firm level, the production function (1) exhibits decreasing returns to scale in the variable factor (i.e., human capital), reflecting the limited span of control of the single manager (Lucas, 1978). Taking the wage rate w_t as given, entrepreneurs choose the quantity of efficiency units of human capital so as to maximize profits per unit of time spent running the firm:

$$\max_{H_t^i \geq 0} \pi_t^i = A_t m_t^i (H_t^i)^{1-\alpha} - w_t H_t^i. \quad (2)$$

The conditional demand function of human capital for firm i is therefore:

$$H_t^i = \left(\frac{(1-\alpha) A_t m_t^i}{w_t} \right)^{1/\alpha}. \quad (3)$$

Substituting (3) in (2), the maximum profits per unit of time of an entrepreneur with managerial capital m_t^i are:

$$\pi_t^i = \pi_t (m_t^i)^{1/\alpha}, \quad (4)$$

where $\pi_t = \alpha ((1-\alpha)^{1-\alpha} A_t / w_t^{1-\alpha})^{1/\alpha}$ are the profits per efficiency unit of managerial capital, that depend positively on the level of the aggregate technology and negatively on the wage rate.

3.2 Production factors

⁸Hereafter, the terms manager, entrepreneur and firm will be used interchangeably. The possibility of external management is considered in Section 8.2.

⁹Following Lucas (1978), physical capital could be introduced, without affecting the qualitative results of the model, by assuming a small open economy with perfect capital mobility and allowing the decreasing returns to scale to depend on a span of control parameter.

3.2.1 Managerial capital

The managerial capital of the firm originates from two sources: the entrepreneurial human capital of the leader and the family connections. We assume that the former is more dependent on the individuals' innate abilities than the latter, but both need to be cultivated by time investments on the part of parents. The idea is that the innate abilities may transform into entrepreneurial human capital only after a period of formal and/or on-the-job training in childhood, which requires the investment of resources (unit of time) by the parents. Likewise, family connections are established by the parents who spend time and effort in cultivating and introducing their heirs into a network of economic, social and political relations. Formally, the managerial capital is assumed to be equal to:

$$m_{t+1}^i = a_{t+1}^i \tau_{a,t}^p + \iota \phi (1 - g_{t+1}) \tau_{\phi,t}^p, \quad (5)$$

where a_{t+1}^i is the innate ability of individual i of generation $t + 1$, and $\tau_{a,t}^p$ and $\tau_{\phi,t}^p$ indicate the fraction of time spent by the parent $p = e, w$ (e for entrepreneur and w for worker) to form, respectively, the entrepreneurial human capital of the child and the network of family connections.

Consistently with the evidence discussed in Section 2.2, equation (5) incorporates the idea that part of the individual managerial capital is embedded in the web of connections built by the previous generation of family entrepreneurs and that family connections are non-tradeable. Accordingly, the indicator function $\iota = 0, 1$ takes value 1 if the individual's parent is an entrepreneur and value 0 if he is a worker. Further, in order to capture the relatively greater importance of talent in shaping the entrepreneurial human capital rather than the network of family connections, we assume that the latter is not at all sensitive to the innate ability of the manager¹⁰.

Accessibility to family relations and contacts introduces a source of heterogeneity across firms through which we can discriminate between family and individual firms, in accordance with the classification introduced by Morikawa (2001). Individual firms are those which are “owned and managed by [their] founders”, while the family firms are “owned and managed by ... heirs of the founder after the founder retires” (Morikawa, 2001, pp. 3-4). In our setting, this dichotomy implies that while heirs can manage the family firm by exploiting both their entrepreneurial human capital and the web of family connections inherited from the previous generation of entrepreneurs, new potential entrepreneurs can rely only on their entrepreneurial human capital to found and run individual firms.

The strength of the comparative advantage that entrepreneurs' descendants have with respect to new potential entrepreneurs depends on the value of family connections in doing business and extracting profits from a given combination of inputs, which is determined by the socio-cultural structure and the technological dynamism of the economy.

¹⁰Our results are robust to more general functional forms of equation (5) that also account for the possible complementarity between family connections and entrepreneurial human capital as well as for the possibility that family connections depend, at least partly, on individual innate ability (see Section 8).

The parameter $\phi \geq 0$ captures the extent to which the social, cultural and institutional arrangements of society cause personal relationships to be a factor influencing firm's profitability relative to entrepreneurial human capital: high values of ϕ are associated to social structures in which personal relationships, contacts and reputation are of great importance for doing business; at the other extreme, $\phi = 0$ describes societies in which family connections and social embeddedness have no influence on firm performance which only depends on the entrepreneurial ability of its conductor. We further assume that the relative productivity of the network of family contacts is subject to an erosion effect due to the dynamism of the economy, which is identified by the growth rate of the aggregate technology $g_{t+1} = (A_{t+1} - A_t)/A_t$. The idea is that in societies where new technologies are introduced at high pace, the transfer of reputation and personal relationships across generations is less feasible and worthwhile, and the productivity of family connections deteriorates more rapidly than that of human capital (Galor and Moav, 2000; Hassler and Mora, 2000).

3.2.2 General human capital

Alternatively, agents can find occupation as wage-earners by supplying efficiency units of general human capital h_{t+1}^i . Again, the human capital accumulated by individuals in childhood depends both on their innate ability and the time that parents spend on the education of children, $\tau_{h,t}^p$:

$$h_{t+1}^i = a_{t+1}^i \tau_{h,t}^p. \quad (6)$$

3.3 Preferences and choices

At time t , two types of adult individuals coexist in the economy: the parent entrepreneurs and the parent workers. Individuals' preferences are defined over the second-period household consumption c_t^i , and the future income of their children I_{t+1}^i , and are represented by a log-linear utility function:

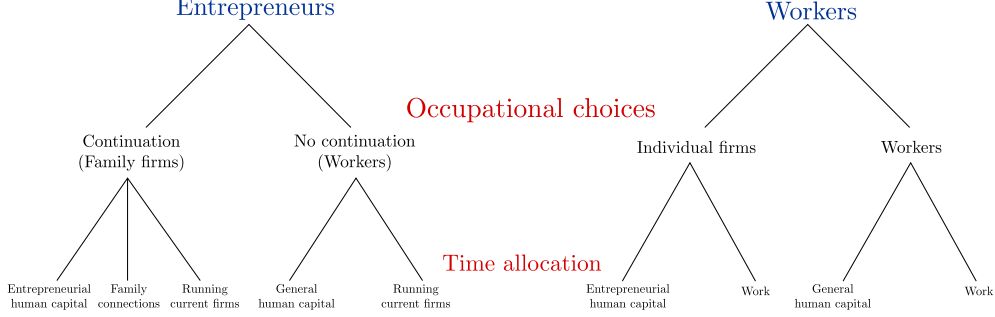
$$u_t^i = \gamma \ln c_t^i + (1 - \gamma) \ln I_{t+1}^i. \quad (7)$$

The entrepreneurs have to decide whether to retain control of the firm within the family or shut the firm down. Conditional on choosing to continue the firm within the family, they have to choose how to allocate their unit of time between nurturing the entrepreneurial skills of descendants ($\tau_{a,t}^e$), building a network of family connections ($\tau_{\phi,t}^e$) and running their own firm ($1 - \tau_{a,t}^e - \tau_{\phi,t}^e$). Alternatively, the entrepreneurs can shut the firm down and share their unit of time between the upbringing of the general human capital of the children ($\tau_{h,t}^e$) and the management of their own firm ($1 - \tau_{h,t}^e$).

Correspondingly, parent workers have to decide whether to initiate their children to the entrepreneurial or wage-earning career. In the first case, they devote their unit of time to cultivate the entrepreneurial human capital of descendants ($\tau_{a,t}^w$) and work for a wage.

In the second case, instead, the allocation of time is between the descendants' general human capital ($\tau_{h,t}^w$) and their own job. Figure 1 summarizes the parents' choices.

Figure 1: Parents' choices



Moving backward, we first analyze the optimal allocation of time by parents and then we study the occupational choices by comparing the maximum utilities received along each possible career option for the descendants. Finally, we examine the aggregate consistency of the individual occupational and educational choices by deriving the aggregate demand and supply of general human capital, and the labor market equilibrium.

4 Optimal choices

4.1 Allocation of time

4.1.1 Entrepreneurs

Continuation. Conditional on choosing to continue the firm within the family, parent entrepreneurs share their time between the accumulation of the managerial capital of the heirs and the operation of the firm they own, such that their budget constraint is:

$$\pi_t^i (1 - \tau_{\phi,t}^e - \tau_{a,t}^e) = c_t^i. \quad (8)$$

The income of the heirs is determined by the profits they gain when in charge of managing the firm. From (4) and (5), it is given by:

$$I_{t+1}^i = \pi_{t+1}^i = \pi_{t+1} [a_{t+1}^i \tau_{a,t}^e + \phi (1 - g_{t+1}) \tau_{\phi,t}^e]^{1/\alpha}. \quad (9)$$

Substituting (9) and (8) into (7), the optimization problem of the entrepreneurs of generation t is:

$$\begin{aligned} (\tau_{\phi}^e, \tau_a^e) = \arg \max \{ & \gamma \ln [\pi_t^i (1 - \tau_{\phi,t}^e - \tau_{a,t}^e)] + \\ & + (1 - \gamma) \ln [\pi_{t+1} (\phi (1 - g_{t+1}) \tau_{\phi,t}^e + \tau_{a,t}^e a_{t+1}^i)^{1/\alpha}] \}, \\ \text{s.t.} \quad & \tau_{a,t}^e + \tau_{\phi,t}^e \leq 1, \\ & \tau_{a,t}^e \geq 0; \tau_{\phi,t}^e \geq 0. \end{aligned} \quad (10)$$

Solving (10), the optimal allocation of time between building family connections and the accumulation of heirs' entrepreneurial human capital is:

$$(\tau_\phi^e, \tau_a^e) = \begin{cases} \left(\frac{1-\gamma}{1-\gamma(1-\alpha)}, 0 \right) & \text{if } a_{t+1}^i < \bar{a}_{t+1} = \phi(1-g_{t+1}) \\ \left(0, \frac{1-\gamma}{1-\gamma(1-\alpha)} \right) & \text{if } a_{t+1}^i \geq \bar{a}_{t+1} = \phi(1-g_{t+1}), \end{cases} \quad (11)$$

where $\bar{a}_{t+1}$ is the threshold level of heirs' ability for which parents are indifferent between the two choices. From (11), conditional on firm continuation, parent entrepreneurs invest a fraction of time, $\alpha\gamma/(1-\gamma(1-\alpha))$, in running their own firms and the rest either in nurturing the entrepreneurial skills of the heirs or in networking, according to whether the innate talent of the heirs (i.e., the marginal productivity of investment in entrepreneurial human capital) is higher or lower than the marginal productivity of networking, $\phi(1-g_{t+1})$. If the innate talent is low, parents prefer to invest time in building a system of family relationships that can facilitate the firm's performance and guarantee a certain level of profits to the successor regardless of his low talent. In contrast, if the heirs are very talented, it is more rewarding for parent entrepreneurs to spend their time enhancing the entrepreneurial human capital of their heirs. Hence, the maximum utility of the parent entrepreneurs is described by the following piecewise indirect utility function:

$$v_e^e = \begin{cases} \delta + \gamma \ln \pi_t^i + (1-\gamma) \ln [\pi_{t+1} (\phi(1-g_{t+1}))^{1/\alpha}] \equiv v_{e,\phi}^e & \text{if } a_{t+1}^i < \bar{a}_{t+1} \\ \delta + \gamma \ln \pi_t^i + (1-\gamma) \ln [\pi_{t+1} (a_{t+1}^i)^{1/\alpha}] \equiv v_{e,a}^e & \text{if } a_{t+1}^i \geq \bar{a}_{t+1}, \end{cases} \quad (12)$$

where the superscript indicates the occupation of the parent, the subscript indicates the occupational choice for the heirs and the type of managerial capital accumulated, and δ is a collection of parameters¹¹.

No continuation. Conditional on the entrepreneur choosing not to continue the firm, the income of the descendant is given by the wage earned on the labor market $I_{t+1}^i = w_{t+1} h_{t+1}^i$, which is determined by the equilibrium wage rate and the amount of efficiency units of human capital he/she accumulates and supplies. Hence, parent entrepreneurs choose how much time to devote to the accumulation of the general human capital of their children by solving the following maximization program:

$$\begin{aligned} \tau_h^e &= \arg \max \left\{ \gamma \ln [\pi_t^i (1-\tau_{h,t}^e)] + (1-\gamma) \ln (w_{t+1} a_{t+1}^i \tau_{h,t}^e) \right\}, \\ \text{s.t.} \quad & 0 \leq \tau_{h,t}^e \leq 1. \end{aligned} \quad (13)$$

From (13), parent entrepreneurs optimally allocate a fraction of time $\tau_h^e = 1-\gamma$ to cultivate the general human capital of their children such that their indirect utility function is:

$$v_w^e = \eta + \gamma \ln \pi_t^i + (1-\gamma) \ln (w_{t+1} a_{t+1}^i), \quad (14)$$

¹¹Namely, $\delta = \gamma \ln \gamma + \gamma \ln \alpha + \alpha^{-1}(1-\gamma) \ln(1-\gamma) - \alpha^{-1}(1-\gamma(1-\alpha)) \ln(1-\gamma(1-\alpha))$.

with $\eta = \gamma \ln \gamma + (1 - \gamma) \ln (1 - \gamma)$.

4.1.2 Workers

Like the entrepreneurs, parent workers can choose between the wage-earning and entrepreneurial careers for their descendants. However, unlike parent entrepreneurs, workers cannot invest their time in building social and political connections for their descendants. Hence, parent workers share their unit of time between working for a wage and improving either the general or entrepreneurial human capital of their children such that the two maximization programs are:

$$\begin{aligned} \tau_h^w &= \arg \max \left\{ \gamma \ln [w_t^i (1 - \tau_{h,t}^w)] + (1 - \gamma) \ln (w_{t+1} a_{t+1}^i \tau_{h,t}^w) \right\} \\ \text{s.t.} \quad & 0 \leq \tau_{h,t}^w \leq 1, \end{aligned} \quad (15)$$

and

$$\begin{aligned} \tau_a^w &= \arg \max \left\{ \gamma \ln [w_t^i (1 - \tau_{a,t}^w)] + (1 - \gamma) \ln [\pi_{t+1} (a_{t+1}^i \tau_{a,t}^w)^{1/\alpha}] \right\} \\ \text{s.t.} \quad & 0 \leq \tau_{a,t}^w \leq 1. \end{aligned} \quad (16)$$

Solving the two maximization programs, it can be verified that, likewise parent entrepreneurs, parent workers invest the fractions of time $\tau_h^w = 1 - \gamma$ and $\tau_a^w = (1 - \gamma)/[1 - \gamma(1 - \alpha)]$ to cultivate the general and entrepreneurial human capital of the descendants, depending on the occupational choice made. This derives as, in our setting, the workers' descendants have exactly the same occupational opportunities as the heirs of entrepreneurs. The only difference between the two is that the former cannot rely on the web of family connections. Hence, the indirect utility functions of parent workers are:

$$v_w^w = \eta + \gamma \ln w_t^i + (1 - \gamma) \ln (w_{t+1} a_{t+1}^i) \quad (17)$$

$$v_e^w = \delta + \gamma \ln w_t^i + (1 - \gamma) \ln [\pi_{t+1} (a_{t+1}^i)^{1/\alpha}]. \quad (18)$$

4.2 Occupational choice

4.2.1 Entrepreneurs

Parent entrepreneurs choose to continue the firm within the family or to shut it down and initiate their descendants to a wage-earning career by comparing the indirect utility functions in (12) and (14). Let a_{t+1}^ϕ be the level of the descendant's innate ability such that the parent is indifferent between leaving the leadership of the company to the heir by investing in family connections and inducing the descendant to work for a wage; formally, $a_{t+1}^\phi \equiv a_{t+1}^i : v_{e,\phi}^e = v_w^e$. Likewise, let a_{t+1}^a be the level of the descendant's talent such that the continuation choice by investing in the descendant's entrepreneurial human capital and the non-continuation choice provide the same utility to the parent; formally, $a_{t+1}^a \equiv a_{t+1}^i :$

$v_{e,a}^e = v_w^e$. From (12) and (14),

$$a_{t+1}^\phi = \theta \left[\frac{\phi(1 - g_{t+1}) A_{t+1}}{w_{t+1}} \right]^{\frac{1}{\alpha}} \quad (19)$$

$$a_{t+1}^a = \left(\frac{w_{t+1}}{\theta^\alpha A_{t+1}} \right)^{\frac{1}{1-\alpha}}, \quad (20)$$

where $\theta \equiv \alpha(1 - \alpha)^{\frac{1-\alpha}{\alpha}} \exp[(\delta - \eta)(1 - \gamma)^{-1}]$. The ability thresholds depend, *ceteris paribus*, on the equilibrium wage rate: the higher the income that descendants can gain on the labor market, the lower the incentive of parent entrepreneurs to transmit the firm within the family and hence the lower the threshold a_{t+1}^ϕ and the higher a_{t+1}^a .

Starting from (19) and (20), we can define the following three wage thresholds:

Definition 1. *Let us define:*

- (a) $\tilde{w}_{t+1} = \theta^\alpha A_{t+1}$ as the wage rate at which parents of the most talented individuals are indifferent between continuing the firm by investing in the heirs' entrepreneurial human capital and inducing them to become workers; formally, $\tilde{w}_{t+1}$ is the value of wage such that $a_{t+1}^a = 1$;
- (b) $\hat{w}_{t+1} = \theta^\alpha A_{t+1} \phi(1 - g_{t+1})$ as the wage rate at which parents of the most talented individuals are indifferent between leaving the company to the heirs by investing in family connections and inducing them to become workers; formally, $\hat{w}_{t+1}$ is the value of wage such that $a_{t+1}^\phi = 1$;
- (c) $\hat{w}_{t+1} = \theta^\alpha A_{t+1} [\phi(1 - g_{t+1})]^{1-\alpha}$ as the wage rate at which parents, conditional on choosing to continue the firm, are indifferent between investing in entrepreneurial human capital and family connections; formally, $\hat{w}_{t+1}$ is the value of wage such that $a_{t+1}^\phi = a_{t+1}^a$.

From (19) and (20) and the above definitions, it immediately follows that for any equilibrium wage rate greater than $\tilde{w}$ ¹², the entrepreneurs' descendants will never operate the family firms with entrepreneurial human capital, regardless of their innate abilities, while for any equilibrium wage rate lower than $\hat{w}$ the entrepreneurs' descendants will never become workers. The third threshold, $\hat{w}$, indicates the wage at which parent entrepreneurs are indifferent between investing in family connections or the entrepreneurial human capital of their heirs, conditional on having chosen to continue the firm. By substituting $\hat{w}$ back into equations (19) and (20) we obtain:

Lemma 1. $a_{t+1}^\phi(\hat{w}) = a_{t+1}^a(\hat{w}) = \bar{a}_{t+1}$.

¹²In the rest of the paper and where it does not create ambiguity, we omit the time subscript on the wage thresholds $\tilde{w}$, $\hat{w}$ and $\hat{w}$, to save on notation.

Lemma 1 states that the wage rate at which parents are indifferent between the investment in the two sources of managerial capital also makes them indifferent between the overall choice of continuing the firm or shutting it down. In addition, from Lemma 1 it follows that the decisions of parent entrepreneurs about the occupation and education of their descendants are intertwined and driven not only by the innate ability of the latter, but also by the relative magnitude of the three wage thresholds, which, in turn, depends on the productivity of family connections. In particular, using Definition 1 it follows that:

Lemma 2. *If $\phi(1 - g_{t+1}) < 1$, then $\hat{w} < \hat{w} < \tilde{w}$ holds. Otherwise, if $\phi(1 - g_{t+1}) > 1$, $\tilde{w} < \hat{w} < \hat{w}$ holds.*

As long as the socio-cultural structure and technological dynamism of the economy do not allow family connections to be very productive (i.e., $\phi(1 - g_{t+1}) < 1$), the wage rate that makes parents indifferent between continuing the firm or shutting it down falls in the interval $\hat{w} < \hat{w} < \tilde{w}$. This implies that, conditional on the choice of continuing the firm, the investment of time in the accumulation of entrepreneurial human capital is rewarding for, at least, some range of the heirs' innate talents¹³. In contrast, when the productivity of family connections is high (i.e., $\phi(1 - g_{t+1}) \geq 1$), building a network of family connections becomes the dominant investment strategy, and the accumulation of entrepreneurial human capital is never rewarding, regardless of the innate talent of the heirs.

Proposition 1 summarizes the occupational choices of parent entrepreneurs, distinguishing two possible regimes.

Proposition 1. *The occupational choices of parent entrepreneurs are:*

Regime I. *When the marginal productivity of family connections is lower than the marginal productivity of entrepreneurial human capital, $\phi(1 - g_{t+1}) < 1$, then:*

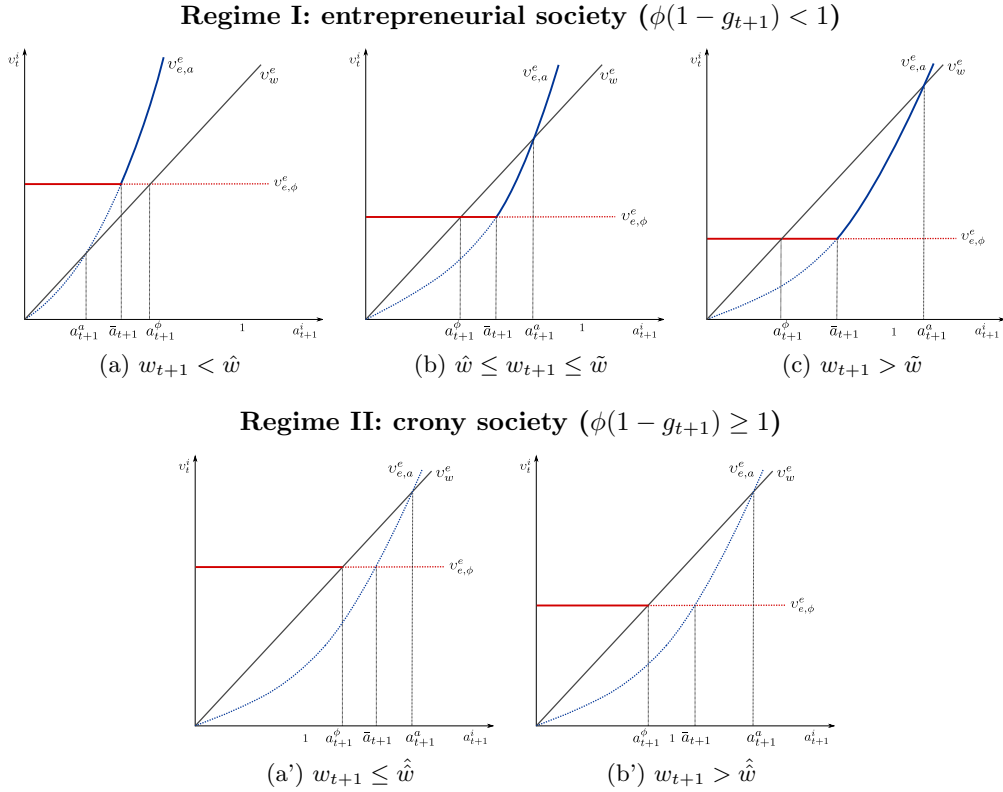
- (a) *for any $w_{t+1} < \hat{w}$, all the descendants continue the family firms. For heirs with abilities $a_{t+1}^i < \bar{a}_{t+1}$, parents continue the firms by investing in family connections; for heirs with abilities $a_{t+1}^i \geq \bar{a}_{t+1}$, parents continue the firms by investing in the heirs' entrepreneurial human capital (Fig. 2a);*
- (b) *for any $w_{t+1} \in [\hat{w}, \tilde{w}]$, the descendants with intermediate innate abilities, $a_{t+1}^i \in (a_{t+1}^\phi, a_{t+1}^a)$, become workers, while the others continue the family firms. For the least talented heirs, those with $a_{t+1}^i \leq a_{t+1}^\phi$, parents choose to invest in family connections, while for the most talented ones, those with $a_{t+1}^i \geq a_{t+1}^a$, parents choose to invest in their entrepreneurial human capital (Fig. 2b);*
- (c) *for any $w_{t+1} > \tilde{w}$, only low ability heirs, those with $a_{t+1}^i \leq a_{t+1}^\phi$, continue the family firms on account of family connections. All the others, those with $a_{t+1}^i > a_{t+1}^\phi$, become workers (Fig. 2c).*

¹³In the extreme case of $\phi = 0$ and/or $g_{t+1} \geq 1$, the model collapses to the benchmark case studied by Lucas (1978).

Regime II. When the marginal productivity of family connections is greater than that of entrepreneurial human capital, $\phi(1 - g_{t+1}) \geq 1$, then:

- (a') for any $w_{t+1} \leq \hat{w}$, all the descendants continue the family firms by exploiting family connections (Fig. 2a');
(b') for any $w_{t+1} > \hat{w}$, low ability heirs, those with $a_{t+1}^i \leq a_{t+1}^\phi$, continue the family firms on account of family connections. All the others, those with $a_{t+1}^i > a_{t+1}^\phi$, become workers (Fig. 2b').

Figure 2: Entrepreneurs' occupational choice



In Figure 2 we provide a graphical representation of the occupational choice of parent entrepreneurs. In the first regime (the entrepreneurial society), the productivity of family connections is sufficiently small such that continuing the family firm by investing time in the entrepreneurial human capital of descendants and allowing for entrepreneurial management practices can be an optimal choice for parent entrepreneurs. When the market wage is low (i.e., $w_{t+1} < \hat{w}$), the option of the employment sector is unattractive. The parent entrepreneurs will never shut their firms down, and the control of all the firms in the economy is retained within the family. Therefore, the heirs with an ability level lower than $\bar{a}_{t+1}$ continue operating the family businesses using crony management practices, taking advantage of the system of relations inherited from their parents, while those with an ability level higher than $\bar{a}_{t+1}$ receive an entrepreneurial education that they employ in

managing the family firms using entrepreneurial management practices (panel 2a). For higher wage values, leaving the family business becomes a rewarding option. In particular, for intermediate wage rates, the polarization of family firms in terms of the talent of the leader and management practices emerges (panel 2b): heirs with an innate ability lower than a_{t+1}^ϕ as well as heirs with an ability level higher than a_{t+1}^a continue the family business, while those with an ability level $a_{t+1}^i \in (a_{t+1}^\phi, a_{t+1}^a)$ leave the family business to work for a wage. In this case, low ability agents would earn a wage on the labor market lower than the profits they gain by running the family firm, taking advantage of the network of family connections; conversely, high ability heirs are selected by their parents to continue the family business since the potential profits they can generate by exploiting their entrepreneurial ability and best management practices exceed the wage they could earn as employees. Finally, for high wage rates, only descendants in the lower tail of the ability distribution (i.e., $a_{t+1}^i \leq a_{t+1}^\phi$) continue the firm by exploiting family connections, while all the others will leave the company to join the employment sector (panel 2c).

In the second regime (the crony society), the productivity of family connections is so high that it is never profitable for parent entrepreneurs to transfer the control of the firm within the family by investing in the entrepreneurial ability of their descendants. In this case, from Lemma 2, the only relevant wage threshold is $\hat{w}$. If $w_{t+1} < \hat{w}$, working for a wage is a low rewarding alternative and all the heirs retain the control of the company, exploiting the family connections inherited from their parents and using crony management practices (panel 2a'). Otherwise, if the market wage is greater than $\hat{w}$, the wage-earning career is a rewarding option for the highest ability individuals and parent entrepreneurs invest time in accumulating their general human capital (panel 2b').

4.2.2 Workers

As parent workers cannot invest time in building family connections for their descendants, their occupational choices are independent of the society's regime (entrepreneurial or crony). Thus, the decision between the entrepreneurial and the wage-earning career for their descendants is regulated only by the wage threshold $\tilde{w}$ and by the descendants' innate abilities. Using equations (17) and (18), it follows that, given the market wage w_{t+1} , the threshold level of heirs' innate ability such that the parent worker is indifferent between initiating them into a wage-earning career, by investing in general human capital, and allowing them to found a new enterprise, by investing in entrepreneurial human capital, is exactly a_{t+1}^a as in (20). Therefore,

Proposition 2. *The occupational choices of parent workers are:*

- (a) *for any $w_{t+1} \leq \tilde{w}$, the highest ability descendants, those with $a_{t+1}^i \geq a_{t+1}^a$, accumulate entrepreneurial human capital and found new individual firms, while the least talented ones, those with $a_{t+1}^i < a_{t+1}^a$, become workers;*
- (b) *for any $w_{t+1} > \tilde{w}$, all descendants become workers, regardless of their innate abilities.*

Figure 3: Workers' occupational choice

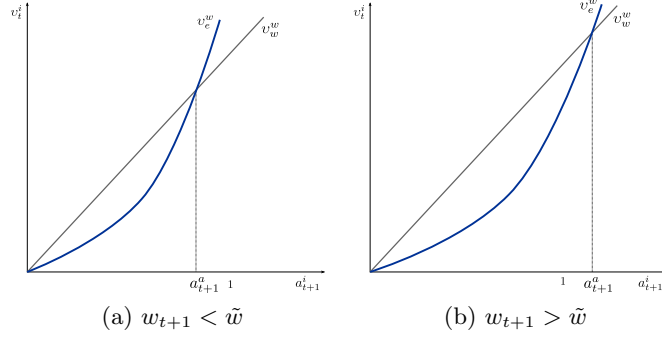


Figure 3 displays the occupational choice of parent workers. When the market wage rate is low, the employment sector is unattractive to highly talented descendants who may gain a higher income by starting an individual firm (panel 3a). In contrast, when the market wage rate is very high, working for a wage is the most rewarding option for workers' descendants whatever their innate talent (panel 3b).

5 Equilibrium

In this section we characterize the equilibrium configuration, in terms of size, management practices and leadership talent, of family and non-family firms when the aggregate technology evolves exogenously at a constant rate g , and, as a result, the productivity of family connections is also constant.

The economy is in a steady-state equilibrium if, at any time t , the allocations of talent and time, the wage rate and the number of firms are such that: (i) parents optimally choose the occupations for their descendants and allocate their unit of time between their own activity and the managerial or general human capital of their children; (ii) firms maximize profits; (iii) the labor market clears; (iv) industry size is constant over time, $n_{t+1} = n_t = n^*$, for any $t = 0 \dots \infty$.

5.1 Labor market equilibrium

The aggregate supply and demand of general human capital are endogenously determined by the educational and occupational choices that parents make for their descendants. Using equations (3) and (6) and integrating the optimal choices of each type of parent (entrepreneur and worker) over the innate ability distribution of the young individuals, the aggregate supply and demand of human capital are:

$$H_{t+1}^{S,R}(w_{t+1}) = \int_{\mathcal{W}} h_{t+1}^i da_{t+1}^i = \int_{\mathcal{W}} a_{t+1}^i \tau_h^p da_{t+1}^i \quad (21)$$

and

$$H_{t+1}^{D,R}(w_{t+1}) = \int_{\mathcal{N}} H_{t+1}^i da_{t+1}^i = \int_{\mathcal{N}} \left(\frac{(1-\alpha) A_{t+1} m_{t+1}^i}{w_{t+1}} \right)^{1/\alpha} da_{t+1}^i, \quad (22)$$

where $\mathcal{N}$ and $\mathcal{W}$ are the relevant sets of firms and workers at time $t+1$ reflecting the occupational choices of parents at time t and $R = E, C$ denotes the regime of society, entrepreneurial or crony.

Proposition 3. *In both the entrepreneurial and crony regimes, for any n_t , a unique competitive equilibrium exists, defined by the tuple $\{w_{t+1}^R, H_{t+1}^{S,R}, H_{t+1}^{D,R}\}$ such that $H_{t+1}^{S,R}(w_{t+1}^R) = H_{t+1}^{D,R}(w_{t+1}^R)$.*

The equilibrium wage rate w_{t+1}^R varies with the number of firms operating in the previous period t . This is due to the heterogeneity of firms associated to the possibility of accumulating and transmitting family connections. The higher the number of firms in t , the higher the number of entrepreneurial parents who can choose to invest in family connections and transmit them to their descendants in $t+1$. This induces some individuals, who, lacking family connections, would have chosen to work for a wage, to continue the family firm, thus causing an increase in labor demand and a decrease in labor supply.

Hence, the occupational choices made by parents in t determine the number of firms in $t+1$, but at the same time they are regulated by the number of firms operating in t . This implies that to fully characterize the steady state equilibrium of the economy we have to study the joint evolution of the occupational choices and the number of firms in the economy. Therefore:

Corollary 1. *The equilibrium wage monotonically increases with the number of firms operating in the previous period: $\partial w_{t+1}^R / \partial n_t > 0$. Thus, there exist four thresholds $\hat{n}$, $\tilde{n}$, $\hat{\tilde{n}}$ and $\hat{\hat{n}}$ such that: in an entrepreneurial society, (a) $n_t < \hat{n} \Rightarrow w_{t+1}^E < \hat{w}$; (b) $n_t \in [\hat{n}, \tilde{n}] \Rightarrow w_{t+1}^E \in [\hat{w}, \tilde{w}]$; (c) $n_t > \tilde{n} \Rightarrow w_{t+1}^E > \tilde{w}$. In a crony society, (a') $n_t < \tilde{\tilde{n}} \Rightarrow w_{t+1}^C < \tilde{\tilde{w}}$; (b') $n_t \in [\tilde{\tilde{n}}, \hat{\tilde{n}}] \Rightarrow w_{t+1}^C \in [\tilde{\tilde{w}}, \hat{\tilde{w}}]$; (c') $n_t > \hat{\tilde{n}} \Rightarrow w_{t+1}^C > \hat{\tilde{w}}$.*

Corollary 1 greatly simplifies the analysis by allowing the wage thresholds determining the occupational choice to be matched to correspondingly one-period lagged threshold numbers of firms. In this way, in order to establish the existence and stability of a steady state equilibrium we can limit our attention to the dynamics of firm numbers under the assumption that in each period t the labor market clears.

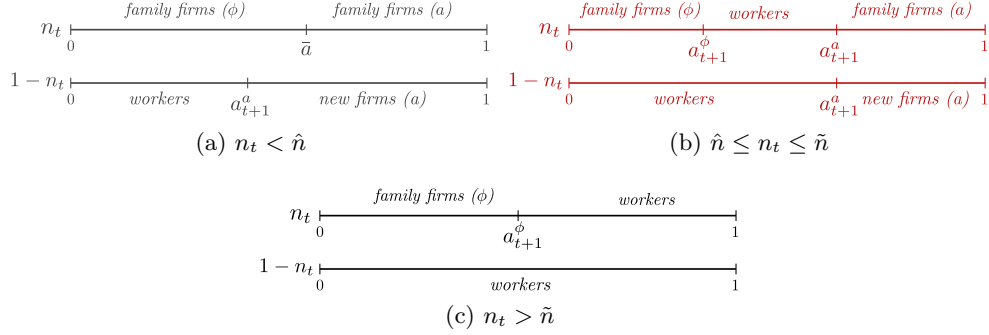
5.2 Industry size, management practices and leadership talent across firms

5.2.1 Entrepreneurial society

From Corollary 1, we can restate the occupational choice of parents and the type of managerial capital in which they invest resources reported in Proposition 1, and the corresponding configurations of family and non-family businesses in $t+1$, in terms of the number of firms in existence in the previous period. Figure 4 reproduces the evolution

of industry size and structure in an entrepreneurial society when the growth rate of the economy and the productivity of social connections are assumed to be constant over time.

Figure 4: Firms and workers in $t + 1$: entrepreneurial society



When $n_t < \hat{n}$, the expected wage rate is low enough that all the family firms in t continue their activity in $t + 1$: low-talented heirs, $n_t \bar{a}$, continue the family business by using family connections, while $n_t (1 - \bar{a})$ high-talented heirs use entrepreneurial human capital. In addition, a number of high-talented workers' descendants, $(1 - n_t) (1 - a_{t+1}^a)$, start new individual firms by using entrepreneurial human capital (Fig. 4a). This excess of entry in the entrepreneurial sector drives an increase in the number of firms in the economy.

In contrast, when $n_t > \tilde{n}$, the expected wage rate in $t + 1$ is so high that the only firms in the economy, $n_t a_{t+1}^\phi$, are family firms operated by the low ability heirs relying on the network of family connections built by their parents (Fig. 4c). In this case, the excess of exit from the entrepreneurial sector reduces the number of firms in the economy.

When $n_t \in [\hat{n}, \tilde{n}]$, the wage rate is such that $n_t (a_{t+1}^a - a_{t+1}^\phi)$ entrepreneurs' descendants exit from the family business sector and enter the labor market, while $n_t a_{t+1}^\phi$ descendants inherit the business activity by using family connections and $n_t (1 - a_{t+1}^a)$ continue the firm by using the entrepreneurial human capital (Fig. 4b). Likewise, the fraction $(1 - n_t) (1 - a_{t+1}^a)$ of workers' descendants endowed with high innate talent enters the entrepreneurial sector. Hence, we can prove that a steady state industry configuration exists such that the number of family firms shut down is equal to the number of new firms founded in any period of time.

Proposition 4. *If $\phi(1 - g) < 1$, a unique and globally stable steady state number of firms*

$$n_E^* = \frac{1 - a^a}{1 - a^\phi}$$

exists, with $n_E^ \in [\hat{n}, \tilde{n}]$ such that individuals' talent across occupations is that depicted in Figure 4b and the rate of social mobility is positive.*

In an entrepreneurial society, the steady-state equilibrium is marked by a positive rate of social mobility between labor and industry and by a polarization in the distribution

of individual abilities of the heirs succeeding to the leadership of the family firm and in the managerial practices deployed to lead a company. The highly talented descendants of entrepreneurs are left the guidance of the family firm and manage it by using the entrepreneurial human capital accumulated in their childhood. The least talented heirs also receive the leadership of the family firm, but they manage it by using the social, economic and political connections that their parents built when they were at the head of the company. Hence, in an entrepreneurial society a group of family firms with good management practices and high performance levels coexists with a group of family firms following bad, crony managerial practices and underperforming. In addition, there is no difference in the level of performance between newly founded individual firms and the group of family firms adopting the best management practices: both are directed by highly talented individuals with the same level of entrepreneurial human capital. However, at the aggregate level, the average performance of family firms proves lower than that of individual firms because of the distortion in the allocation of talent caused by the possibility of investing in private family connections.

In steady state equilibrium, the distribution of management practices across family firms and the degree of social mobility are unresponsive to variations in the level of technological progress of the economy, A_t , but react to changes in the rate g at which technology grows over time and to changes in the social, cultural and institutional structure of the society, ϕ .

Proposition 5. *In the entrepreneurial regime, the thresholds a^ϕ and a^a are not dependent on the level of technological progress A_t . However, the higher is the growth rate of the aggregate technology g , or the less importance the society gives to family connections (the lower the value of ϕ), the smaller are both a^ϕ and a^a .*

The first part of Proposition 5 is an obvious corollary of the existence and stability of the steady-state equilibrium. Both the wage rate and profit per efficiency unit of managerial capital have a unitary elasticity with respect to A_t , such that the occupational choices of parents, and, hence, the number and type of firms in the economy, are unaffected by the level of the technological frontier.

By contrast, changes in the growth rate of aggregate technology and in the socio-cultural setting have both direct and general equilibrium effects on the allocation of talent between occupations and on managerial practices adopted by family firms. Higher values of g and lower values of ϕ decrease the productivity of family connections. This renders working for a wage a more rewarding occupation for medium-talented descendants who are therefore induced to abandon the family business. The resultant lower number of firms in the economy generates a reduction in the equilibrium wage rate¹⁴ which, in turn, stimulates some of the individuals in the upper tail of the innate talent distribution to enter the entrepreneurial sector by accumulating entrepreneurial human capital. Hence,

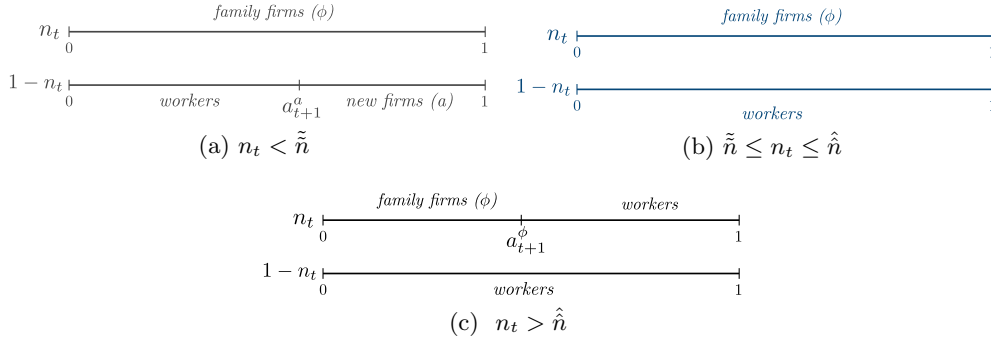
¹⁴It is worth noting that although the combined effect of TFP and occupational changes on the wage rate is ambiguous, the elasticity of the wage with respect to g is, in absolute value, lower than one.

when the pace of growth is more sustained and society attributes less importance to social and political connections, the share of firms which are well managed by relying on the entrepreneurial human capital of the leaders increases, while the share of badly managed family firms relying on the web of family connections decreases.

5.2.2 Crony society

In the crony regime, the socio-cultural environment of society and the pace of technological progress are such that the productivity of family networking is so high that entrepreneurs have no incentive to invest in their heirs' entrepreneurial human capital, whatever their innate talent (see Proposition 1 and Corollary 1).

Figure 5: Firms and workers in $t + 1$: crony society



Furthermore, the descendants of entrepreneurs never leave the family business unless the equilibrium wage rate becomes high enough to make working in the labor market especially rewarding (i.e., for $n_t > \hat{n}$, Fig. 5c). In addition, the most talented workers' descendants choose to change from their parents' occupation and set up new individual firms only if $n_t < \tilde{n}$ and the expected wage in the labor market is low enough (Fig. 5a). In this case, the total number of firms at time $t + 1$ is composed by the number of family firms in t , plus $(1 - n_t)(1 - a_{t+1}^a)$ new individual firms installed by the workers' descendants. Otherwise, if $n_t > \tilde{n}$, the workers' descendants never set up new firms and, at each time $t + 1$, all the firms in the economy are family-run (Fig. 5b and 5c). Hence,

Proposition 6. *If $\phi(1 - g) \geq 1$, the steady state number of firms is indeterminate in the interval $n_C^* \in [\tilde{n}, \hat{n}]$, with no social mobility across occupations.*

In the crony regime, the economy converges into a fully immobile society, where the current generation of individuals takes the same occupation as the previous generation, there is no entry of new individual firms and where, regardless of the innate ability of the current leader, all the family firms are managed by using family connections. The intuition is straightforward. Given the high productivity of family connections, all entrepreneurs transfer the control of firms within the family, using crony management practices. As an indirect effect, the large number of family firms in the economy sustains the aggregate

demand for general human capital and the wage rate, thus inducing parent workers to invest in the general rather than entrepreneurial human capital of their children.

6 Family firms and economic development

Hitherto we assumed that the technology steadily evolves at an exogenous rate g , independent of the allocation of individual talent and the managerial technology employed by firms, and thus that the productivity of family connections is exogenously given. In this section, we remove this assumption by taking into account the mutual feedback effects between social inertia created by family ties and the growth of the aggregate technology.

6.1 Long-run steady state

Ever since Schumpeter published *The Theory of Economic Development* in 1911 (Schumpeter, 1911), entrepreneurship has occupied a special place in economics and economic history as a major factor explaining the abilities of firms to ideate and introduce innovations and economies to prosper (Mokyr, 2002; Casson, 2010; Landes et al., 2012). In the modern growth economics, the driving role of the allocation of entrepreneurial talent and the accumulation of entrepreneurial human capital for the advancement of the aggregate technology have been widely explored and well documented¹⁵.

On such grounds, we assume that the rate g_t at which the aggregate technology grows over time depends positively on the number of firms at time t that are managed by using entrepreneurial human capital and management practices, $\mathcal{N}_t^a$ ¹⁶:

$$g_t = \mathcal{N}_t^a. \quad (23)$$

Then, using (23), we can prove that the economy converges to a steady state equilibrium, whose growth rate depends on the importance that society attributes to access to social and political connections for doing business.

Proposition 7. *When $\phi < 1$, the economy converges to an entrepreneurial regime with a steady state number of firms n_E^* , positive social mobility and a positive growth rate $g_E^* = 1 - a^a(n_E^*)$. When $\phi \geq 1$, the economy converges to a fully immobile crony regime with zero growth rate, $g_C^* = 0$.*

Once the feedback effects between entrepreneurial human capital and the economy's innovation pace are taken into account, the difference between the two regimes becomes even clearer. When the slow moving elements of the socio-cultural structure of society

¹⁵Among others, see Baumol (1990), Murphy et al. (1991), Hassler and Mora (2000), Acemoglu et al. (2006), Galor and Michalopoulos (2012), Gennaioli et al. (2013), Doepke and Zilibotti (2014).

¹⁶A more general representation allowing for a scale parameter, as $g_t = \lambda \mathcal{N}_t^a$, or the assumption that the growth rate depends positively on the number of firms employing entrepreneurial human capital in the previous period, $g_t = \lambda \mathcal{N}_{t-1}^a$, would make the algebra more cumbersome, leaving our results qualitatively unchanged.

are not predominant ($\phi < 1$), the economy will converge to an entrepreneurial regime, where the productivity of family connections permitted by the social structure of the economy is only moderate. In this regime both entrepreneurs and workers invest in the entrepreneurial human capital of their descendants and the distribution of talents and occupations associated to the steady-state number of firms n_E^* is that depicted in Figure 4b, confirming the polarization result of Proposition 4¹⁷. Hence, the accumulation of entrepreneurial human capital causes the total factor productivity and the per capita income to grow at a positive rate.

In contrast, when $\phi \geq 1$ the economy will converge to a crony regime. In this case the socio-cultural structure of society makes the productivity of family connections extremely high (i.e., higher than the marginal productivity of entrepreneurial human capital for the most talented individuals), such that relatedness becomes the only rewarding way to manage a company. The social inertia arising from the use of social connections to manage a firm thus eradicates any possible source of entrepreneurial human capital from the economy, wiping out technological advancements and blocking the economy in a zero-growth equilibrium.

Proposition 8. *In an entrepreneurial society, the more productive the family connections, the lower the steady state growth rate of the economy. In a crony society, marginal changes of ϕ have no effect on the steady state growth rate.*

Two self-reinforcing general equilibrium mechanisms are at work here. When family connections are more productive, current entrepreneurs are more likely to maintain the control of the firms within the family by introducing their low-ability heirs into the network of family connections. This increases the number of firms in the market, the labor demand and the wage rate, thus partially crowding out high-ability and well-educated entrepreneurs who prefer to work for a wage. The resulting decrease in the rate of technological progress further increases the productivity of family connections, thus making it relatively more rewarding to invest in family connections rather than in entrepreneurial human capital.

In an entrepreneurial society, therefore, reforms lowering ϕ affect the size, composition and growth impact of the entrepreneurial sector. In contrast when the economy is blocked in a crony equilibrium, marginal changes of ϕ are unable to modify industry configuration and pull the economy out of the zero-growth trap. Only a socio-institutional shock can put the economy on a positive growth path and create mobility across occupations in society. Once again, historical research provides real-world testimonies to this hypothesis, such as the different evolution of industrialization in Italy and Japan after the Second World War. In both countries the initial boost to industrialization was driven by powerful family

¹⁷In the endogenous case, the threshold $\hat{n}$ becomes negative such that the domain of the steady-state becomes $n_E^* \in [0, \tilde{n}]$. Notice, furthermore, that, in order to simplify exposition and to make the comparison clearer, we do not use different notation to distinguish the variables between the exogenous and endogenous cases. Nonetheless, all the variables in this section, while corresponding to the exogenous ones, take into account the endogeneity of the growth rate.

firms. However, while in Japan the anti-*zaibatsu* laws passed by the Allied occupiers in the postwar period largely weakened the power of the largest family businesses of the country and the related network of connections, opening the route to the modern *keiretsu* system (Morikawa, 2001; Morck and Nakamura, 2007), in the case of Italy such a change never occurred. Even if there were a number of reforms in Italy to reduce the influence of family ownership, their marginal nature was unable to dismantle the pervasiveness of family control and promote modern managerial practices (Amatori, 1997; Colli, 2003).

6.2 Family firms in the process of development

Besides the equilibrium configuration, the transitional analysis toward the steady state adds several insights about the interaction between the evolution of family firms and development process. In particular, we distinguish different endogenous evolutionary patterns of the weight of family firms in the industry and their management efficiency, depending on the importance that the socio-cultural structure of society attributes to social networking and political connections in the business life (ϕ) and on the industry structure in the early stages of development (n_0). As a first step we prove the following lemma relating economic growth, and thus, due to the erosion effect, the productivity of family connections, to industry size.

Lemma 3. *In any period $t + 1$, the growth rate of the economy (the productivity of family connections) is a negative (positive) function of the size of the entrepreneurial sector in the previous period: $\partial g_{t+1}/\partial n_t < 0$.*

6.2.1 Entrepreneurial dynamics

In an entrepreneurial society (i.e., when $\phi < 1$), the dynamic system governing the evolution of the entrepreneurial sector is given by:

$$n_{t+1} = \begin{cases} n_t a_{t+1}^\phi + 1 - a_{t+1}^a & \text{if } n_t \in [0, \tilde{n}] \\ n_t a_{t+1}^\phi & \text{if } n_t > \tilde{n}, \end{cases} \quad (24)$$

while the dynamics of the growth rate is:

$$g_{t+1} = g(n_t) = \begin{cases} 1 - a_{t+1}^a & \text{if } n_t \in [0, \tilde{n}] \\ 0 & \text{if } n_t > \tilde{n}. \end{cases} \quad (25)$$

Proposition 9. *When $\phi < 1$, the number of firms monotonically converges to the steady state equilibrium n_E^* . During the transition:*

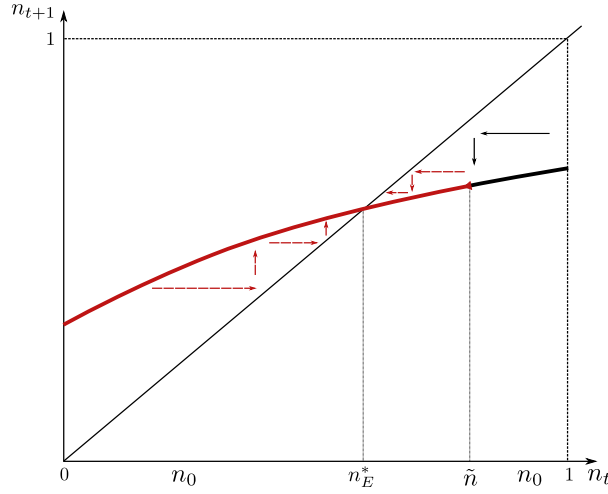
- (a) *for $n_t < n_E^*$, the share of family firms increases and among these the proportion of those using crony management practices increases, while the share of firms managed by entrepreneurial human capital and the growth rate of technology decrease;*

- (b) for $n_t \in [n_E^*, \tilde{n}]$, the shares of family firms and crony family firms decrease, while the share of firms managed by entrepreneurial human capital and the growth rate of technology increase;
- (c) for $n_t > \tilde{n}$, the total number of firms decreases, while the number of family firms managed by entrepreneurial human capital, the entry of new firms and the growth rate of technology are null.

Figure 6 illustrates the industry size dynamics in an entrepreneurial society. When in the initial stages of development the number of firms and the labor market wage are low ($n_0 < n_E^*$), the industry is populated by a large share of family inherited and new founded firms relying on the entrepreneurial human capital of their leaders and society experiences high rates of social mobility. As a result, the economy's aggregate technology and income grow at high rates, thus confirming the scarce value of investing in family connections and the importance of entrepreneurial human capital. Advancing the process of industrialization, the number of firms and the wage rate increase. This causes an increase in the threshold a_{t+1}^a , reflecting a shift in the occupational choices of the most talented individuals from entrepreneurship to wage work, with a reduction of the share of new entrant firms and entrepreneurial family firms and, in turn, with depressing effects on the growth rate of technology and boosting effects on the productivity of social connections. This incentivizes entrepreneurs to continue the firm within the family even if descendants are low talented (i.e., a_{t+1}^ϕ increases), by bequeathing the strong network of social and political connections they built during their life-time and introducing the new generation of entrepreneurs to crony management practices. Ultimately, in the mature stages of industrialization there will be a rise in the overall presence of family firms in the economy and, in particular, in the share of crony family firms exploiting their network of social and political connections, in line with the classic boost-retardation story of family firms. However, to the extent that social connections are only moderately productive, family firms are not an irremediable source of stagnation.

If instead, as is often observed in the history of industrialization (see Section 2.1), the initial stages of development are characterized by the existence of a large number of small, non-entrepreneurial family firms ($n_0 > \tilde{n}$), industry and family firms follow radically different evolutionary patterns. In this case, as long as the growth rate is null, the only sources of change in the industrial structure come from the decrease in the number of firms due to their low productivity. When the number of firms reaches $\tilde{n}$, the wage rate is low enough to make entrepreneurship more profitable for high talented individuals rather than wage work. At this stage, the economy experiences a managerial and growth take-off, with a gradual increase in the share of family and non-family firms using entrepreneurial human capital and management practices. From this moment on, the erosion effect caused by the increasing dynamism of the economy reduces the productivity of family connections, thereby causing a further reduction in the share of family firms and, in particular, of those managed by means of crony practices (i.e., a_{t+1}^ϕ decreases). Con-

Figure 6: Dynamics: entrepreneurial society



trary to what is suggested by the traditional boost-retardation story, along this different evolutionary path family firms, from initially inefficient small business units, evolve into ever more efficient entrepreneurial companies, using entrepreneurial management practices and positively contributing to growth. In addition, in this case, economies can experience reversals of technology and aggregate income. This is due to the ambivalent role played by social and political connections for the economic activity. In the early stages of the development process, when the economy is still in a zero-growth regime¹⁸, family connections contribute positively to firms' productivity and aggregate income in the short run at the cost, however, of delaying the managerial take-off and reducing the long-run growth rate in the mature stages of development.

Proposition 10. *For $g_{t+1} = 0$: (a) the aggregate per-capita income, $Y_{t+1} = \int_{\mathcal{N}} y_{t+1}^i da_{t+1}^i$, is a positive function of ϕ ; (b) the higher the productivity of family connections, the more delayed the adoption of entrepreneurial managerial practices and growth take-off.*

6.2.2 Falling into cronyism

When $\phi \geq 1$ the economy will reach a crony, stagnant steady state equilibrium. However, the industry dynamics toward the steady state can be very different. If having a network of social and political connections is an imperative factor for doing business, the economy is immediately blocked in a crony regime. If otherwise ϕ is only slightly larger than 1, the economy experiences an endogenous regime transition evolving from an entrepreneurial (i.e., $\phi(1 - g_{t+1}) < 1$) to a crony stage (i.e., $\phi(1 - g_{t+1}) \geq 1$).

Proposition 11. *A threshold $\bar{\phi} > 1$ exists such that:*

¹⁸When $g_t > 0$, the relation between aggregate per-capita income and ϕ is ambiguous, and may be monotonically increasing, decreasing or non-monotonically U-shaped depending on the model parameters (numerical simulations are available upon request).

- (a) if $\phi \in [1, \bar{\phi})$ and $n_t < \tilde{n}_T$, the economy experiences an endogenous transition from an entrepreneurial to a crony regime, with the total number of firms first monotonically converging and then discretely jumping to the steady state equilibrium $n_C^* \in [\tilde{n}_T, \hat{n}]$. During the transition, the share of family firms and the proportion of those using crony management practices increase, while the share of firms managed by entrepreneurial human capital and the growth rate decrease to zero;
- (b) if $\phi \geq \bar{\phi}$ and $n_t < \tilde{n}_C$, the economy shows no transitional dynamics and the number of firms converges instantaneously to the steady state $n_C^* \in [\tilde{n}_C, \hat{n}]$;
- (c) if $\phi \geq 1$ and $n_t > \hat{n}$, the economy converges monotonically to the steady state $n_C^* = \hat{n}$; during the transition, the entrepreneurial sector is formed by only family firms exploiting family connections and the growth rate of technology is constantly zero.

As follows from the distributions of talent and occupational choices reported in Figures 4a and 5, the dynamics of n_t and g_t are respectively:

$$n_{t+1} = \begin{cases} 1 - (1 - n_t) a_{t+1}^a & \text{if } n_t < \tilde{n} \\ n_t & \text{if } n_t \in [\tilde{n}, \hat{n}] \\ n_t a_{t+1}^\phi & \text{if } n_t > \hat{n}, \end{cases} \quad (26)$$

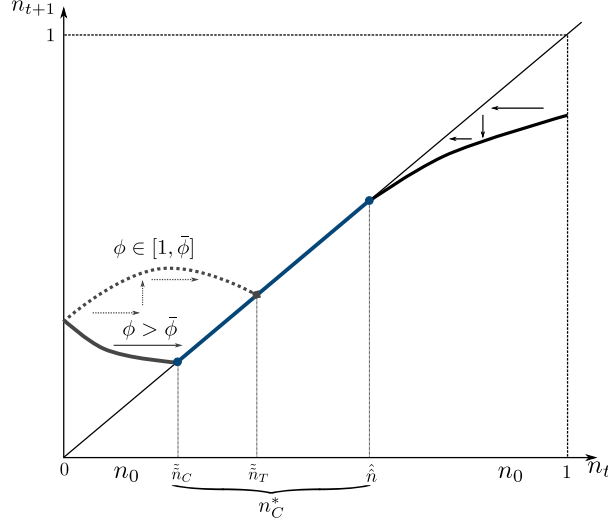
where $\tilde{n} = [\tilde{n}_T, \tilde{n}_C]$ depending on whether $\phi \in [1, \bar{\phi})$ or $\phi \geq \bar{\phi}$, and

$$g_{t+1} = \begin{cases} 1 - \frac{(1 - n_t) a_{t+1}^a}{1 - n_t \phi} & \text{if } n_t < \tilde{n}_T \text{ and } \phi \in [1, \bar{\phi}) \\ (1 - n_t) (1 - a_{t+1}^a) & \text{if } n_t < \tilde{n}_C \text{ and } \phi \geq \bar{\phi} \\ 0 & \text{otherwise.} \end{cases} \quad (27)$$

Figure 7 illustrates the possible transitional dynamics in a crony society. If $\phi \in [1, \bar{\phi})$ and the initial number of firms n_0 is small enough to make $g_0 > (\phi - 1)/\phi$, the economy starts from an entrepreneurial regime, in which the productivity of family connections is lower than 1 and such that part of family firms invest in entrepreneurial human capital and there is the entry of newly founded entrepreneurial firms. However, the increase in the number of firms in the economy and the consequent increase of labor costs will slow down growth until $g_t < (\phi - 1)/\phi$. This pushes the productivity of family connections up to the point in which entrepreneurs no longer have an incentive to invest in the entrepreneurial human capital of their heirs, and all the family firms are managed by exploiting the system of connections through crony management practices. At this stage, while some entry of new firms allowed by the low wage rate may still sustain a positive growth rate, the economy ceases to evolve smoothly and the total number of firms instantaneously jumps to its steady-state value in the interval $[\tilde{n}_T, \hat{n}]$, with a zero growth rate. When this stage is reached, the high productivity of family connections dissuades the new generations of family firm leaders from investing in entrepreneurial human capital and the economy is

stuck in a socially immobile equilibrium, where family firms are perpetuated, using crony management practices.

Figure 7: Dynamics: crony society



If, instead, $\phi \geq \bar{\phi}$ and $n_t < \tilde{n}_C$, the economy does not experience any transitional dynamics and the number of firms instantaneously jumps to a steady state equilibrium $n_C^* \in [\tilde{n}_C, \hat{n}]$. This is the case in which the socio-cultural structure of society gives so much importance to connections that entrepreneurs have no incentive to invest in the entrepreneurial human capital of their heirs; moreover, while the initially small size of the entrepreneurial sector allows entry of some new firms and, hence, a positive growth rate, these vanish quickly in the course of only one generation.

Finally, when the initial number of firms and the market wage rate are high ($n_t > \hat{n}$), the dynamic transition is similar to that analyzed in the previous Section. Also in this case an increase in social connections has supportive effects on the aggregate per capita income in the short run. However, unlike the case of an entrepreneurial society, the high level of the productivity of family connections inhibits the managerial take-off and the economy smoothly converges to the same crony steady state $n_C^* = \hat{n}$.

7 Empirical evidence

From our theoretical framework four main testable empirical hypotheses can be deduced. First, on average, family firms in the second generation or beyond have worse, less entrepreneurial, management practices (*Hypothesis 1*). Second, the average management gap between family and non-family firms tends to decrease in individualistic societies in which the value of the family name, contacts, alliances and friendships to succeed in business (as in life) is low (*Hypothesis 2*). Third, family firms investing resources in the entrepreneurial human capital of their leaders are equally well-managed as non-family firms, independent of the socio-institutional structure of the society and the productivity

of family connections (*Hypothesis 3*). Finally, at the aggregate level, worse management practices, as induced by family connections, are associated to lower steady state growth rates and GDP per capita (*Hypothesis 4*). In this section we provide econometric evidence consistent with the theoretical predictions.

7.1 Management practices across family firms

7.1.1 Data description and empirical strategy

We draw data on management practices and firm ownership from the World Management Survey (WMS) by Nicholas Bloom, Raffaella Sadun and John Van Reenen. In particular we use the 2004-2010 combined survey data, also used by [Bloom et al. \(2012a\)](#). This survey covers over 10,000 manufacturing firms, operating in different industrial sectors, across 20 countries over a ten-year period from 2000 to 2010¹⁹. The quality of management practices (*Management*) is measured by averaging the interview-based evaluations of 18 specific management practices employed by the firms, covering three key areas of business organization: performance monitoring, targets and incentives²⁰. To each managerial practice a score is assigned from 1 (“worst practice”) to 5 (“best practice”) and *Management* is the firm average of each individual question score. The survey also collects information on several firm characteristics, including data on the ownership structure allowing us to define a dummy variable (*Family*) which takes value one for family firms and zero otherwise. Family firms are identified as those firms in which the descendants in the second generation or beyond from the founder are the largest shareholders with at least 25% of equity. In the non-family-firm category, we include all the types of private firms, while excluding government companies²¹.

To proxy the importance and productivity of family connections for doing business in a country, we use the index of individualism (*IDV*) proposed by the Dutch anthropologist Geert Hofstede ([Hofstede et al., 2010](#))²². The *IDV* index combines responses to 14 questions from a survey about work goals initially conducted between 1969 and 1971 by interviewing over 100,000 employees of IBM International working in subsidiaries in 40 countries and then extended over the years to other 40 countries through replications and extensions of the IBM survey on different international populations like commercial airline pilots. *IDV* ranges from 0 (strongly collectivistic) to 100 (strongly individualistic) and amounts to the first factor score from the factor analysis of the countries mean scores for

¹⁹The data are available online at: <http://worldmanagementsurvey.org/wp-content/images/2012/07/AMP.zip>.

²⁰Questions on monitoring try to capture “how well organizations monitor what goes on inside the firm, and use this information for continuous improvement”. Questions on targets focus on how “organizations set the right targets, track the right outcomes, and take appropriate action if the two are inconsistent”. Finally, questions on incentives map whether “organizations promote and reward employees based on performance, and try to keep their best employees”. For further details, see [Bloom and Van Reenen \(2007\)](#) and [Bloom et al. \(2012a\)](#).

²¹Precisely, the non-family firms category includes public firms owned by the founder, firms owned by managers or private individuals, firms with dispersed shareholders, and firms owned by private equity.

²²Data on *IDV* are publicly available at <http://www.geerthofstede.nl/dimension-data-matrix>.

the 14 survey questions. According to Hofstede et al. (2010, p. 92), individualism reflects “the degree to which individuals are integrated into groups. On the individualist side we find societies in which the ties between individuals are loose: everyone is expected to look after him/herself and his/her immediate family. On the collectivist side, we find societies in which people from birth onwards are integrated into strong, cohesive in-groups, often extended families (with uncles, aunts and grandparents) which continue protecting them in exchange for unquestioning loyalty”. Hence, we expect the productivity of family connections to be higher in more collectivistic societies, where the transfer of the web contacts and relationships across generations of entrepreneurs is facilitated by cultural values supporting strong interdependence and cooperation among individuals belonging to the same social network.

To test *Hypotheses 1-2* we estimate the following model:

$$\begin{aligned} Management_{ijct} = & \beta Family_{ijct} + \delta IDV_c + \eta Family_{ijct} \times IDV_c + \\ & + X_{ijct}^F \Phi + \alpha_c + \alpha_c t + \lambda_t + \mu_j + \varepsilon_{ijct}, \end{aligned} \quad (28)$$

with i indicating the firms, j the 155 three-digit US SIC industry sector codes, c the 20 countries and $t = 2000, \dots, 2010$ the time at which the firm was interviewed. X_{ijct}^F is the vector of firm level controls which includes the percentage of managers and non-managers with a college degree (*Education (managers)* and *Education (non-managers)*) and the *Log Firm employment* as an indicator of firm size²³. Finally, regressions include industry-sector fixed effects μ_j as well as country-specific time trends ($\alpha_c t$) and time dummies (λ_t) to consider potentially time variable factors and possible biases in the survey responses that may confound the estimates.

Our coefficients of interest are β and η , expecting the former to be negative (*Hypothesis 1*) while the latter positive (*Hypothesis 2*). We estimate the model with and without the country fixed effects α_c . In the former case, we obviously cannot identify the main effect of time-invariant country level variables and we remove from the set of regressors IDV_c .

To test *Hypothesis 3*, we need to distinguish family firms on the basis of the importance that they attach to family connections rather than entrepreneurial human capital. To this aim we exploit the survey information about whether the family firm is managed by a CEO external to the family (*External CEO*) or whether the actual leadership of a company is in the hand of a family executive (*Family CEO*). As we argued in Section 2, the idea here is that family connections belong to the family and cannot be easily transferred to people outside the family or kinship circle. If this holds true, then it is reasonable to assume that family firms that attach greater importance to the web of family connections for doing their business tend to keep leadership within the family, while family firms that invest in building their managerial capacity are also ready to pass on leadership to outside executives (Chung and Luo, 2013). Against this background, we estimate the following

²³All firm level control variables are drawn from the 2004-2010 combined survey data of the WMS.

model:

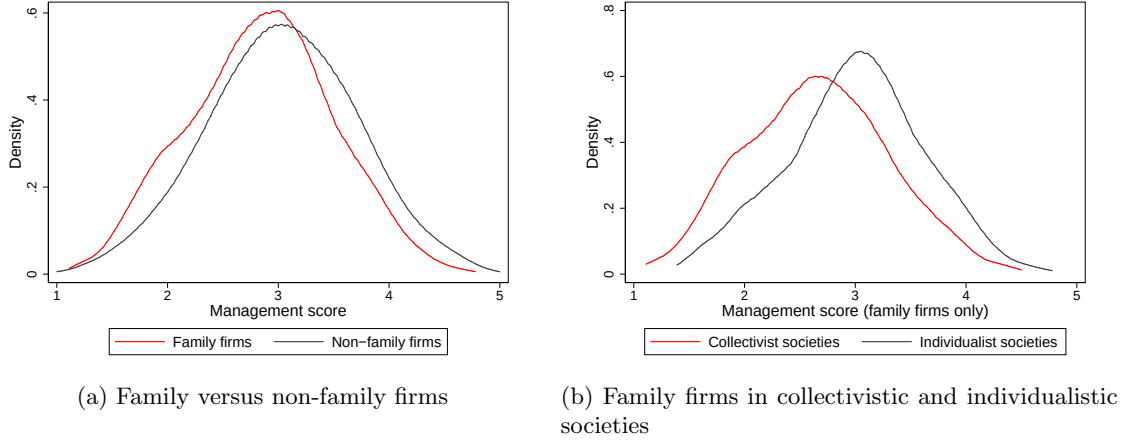
$$\begin{aligned}
Management_{ijct} = & \beta_1 FamilyCEO_{ijct} + \beta_2 ExternalCEO_{ijct} + \delta IDV_c + \\
& + \eta_1 FamilyCEO_{ijct} \times IDV_c + \eta_2 ExternalCEO_{ijct} \times IDV_c + \quad (29) \\
& + X_{ijct}^F \Phi + \alpha_c + \alpha_c t + \lambda_t + \mu_j + \varepsilon_{ijct}.
\end{aligned}$$

Consistent with *Hypothesis 3*, we expect $\beta_1 < 0$ and $\eta_1 > 0$, while β_2 and η_2 should not be statistically significantly different from zero.

7.1.2 Results

A first look at the distribution of the management practice score across family and non-family firms returns a picture in line with a lower average quality of management of the former and a fatter left tail of badly managed enterprises (Fig. 8a). In addition, in collectivistic societies (countries in which the *IDV* index is below the median value in our sample) family firms are worse managed on average than in individualistic societies (countries in which the *IDV* index is above the median value). The difference is explained to a great extent by the much fatter left tail of the management score distribution (Fig. 8b). More interestingly, consistent with our theoretical results, predicting that an increase in the productivity of family connections ϕ leads to an increase in the number of firms managed through connections and a decrease in firms managed by entrepreneurial human capital, Figure 8b reveals that in collectivist societies the family firm management score distribution is largely shifted toward left with respect to the same distribution in individualistic countries.

Figure 8: Management across family and non-family firms, and different societies.



Moving on to the multivariate analysis, in Table 1 we report our regression results. The first five columns display estimates of equation (28). In columns (1)-(3), we start the analysis by excluding the country fixed effects and including only continent dummies. Firm level control variables have the expected signs and are statistically highly significant:

large firms and firms that have a greater share of managers and non-managers with a college degree have better management practices. At the country level, the degree of individualism in the country has a positive and significant effect on the quality of firm management practices, suggesting that firms in individualistic societies make up for the lack of cooperation among individuals with a more efficient organizational structure and effective managerial rules.

Considering our key variables, consistent with *Hypotheses 1* and *2* we find that the coefficient for *Family* is negative and statistically significant at the 1% level, while the coefficient on the interaction term $Family \times IDV$ is statistically significantly positive. Our findings then indicate that family firms tend to be managed worse on average than non-family firms, but that this gap is significantly lower in societies that value social connectivity less and where family connections are a less critical factor in running businesses. The moderating effect of the degree of individualism on the management score gap between family and non-family firms is well depicted in Figure 9, which illustrates the independent linear predictions of family and non-family firms for different levels of the degree of individualism. While family firms have worse management practices than non-family firms, this difference decreases as the degree of individualism increases and in highly individualistic societies (Australia, the UK, and the US in our sample) there is no longer any significant difference between family and non-family firms (panel 9b)²⁴. Also the economic magnitude of this heterogeneity is substantial. Using column (3), a one standard deviation increase in the degree of individualism (23.64), which in our sample corresponds to a move from the individualism degree of Chile toward that of Argentina and Japan, is associated with a reduction of 0.045 (or 4.5%) in the management gap between family and non-family firms, with the management score of Chilean family (non-family) firms increasing from 2.615 (2.786) to 2.783 (2.911)²⁵.

Given the wide variety of time-invariant country characteristics that may affect the firms' management practices, in column (4) we include country fixed effects. All coefficients are stable in magnitude and significance. We further check that these results are robust to the inclusion of several interaction terms between the dummy *Family* and country level factors such as GDP per capita, years of schooling, institutional and other cultural variables²⁶.

Finally, in column (5) we address possible concerns about the endogeneity of *IDV* due to measurement errors or omitted variables by estimating columns (4) with an IV estima-

²⁴Interestingly, these results are not driven by collinearity between *IDV* and *Family*. In unreported OLS and Probit regressions of *Family* on *IDV*, conditioned on our set of control variables and additional country controls, we find that the likelihood of firms being family-owned is not affected by the degree of individualism in the country.

²⁵The marginal effect of *Family* is about -0.171 for Chile and -0.128 for Argentina and Japan.

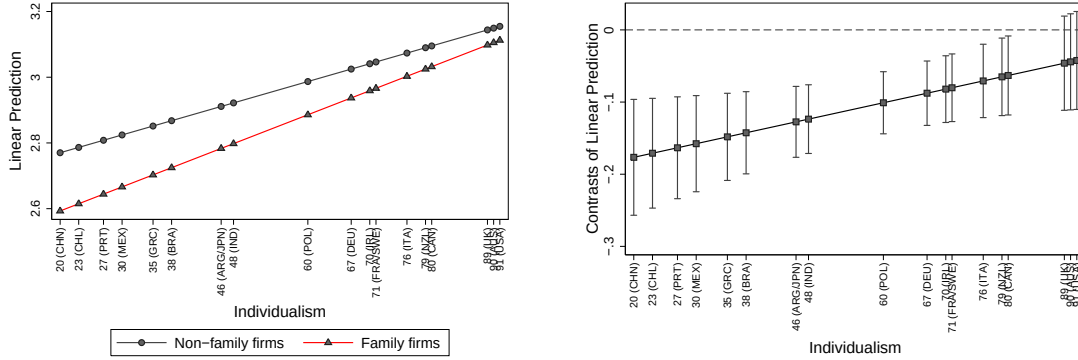
²⁶See tables B.3 and B.4 in Appendix B. As institutional variables we consider an index of *Institutional Quality* measured by the first principal component of the 2000-2010 average of the six measures of the World Bank's Worldwide Governance Indicators (Kaufmann et al., 2010), and two of its subcomponents, *Corruption* and *Rule of Law*. As cultural variables we test *Family Ties*, *Trust*, and *Ethnic, Linguistic and Religious Fractionalization*. See Appendix B.2 for details on the construction and sources of the variables.

Table 1: Management practices and social structure

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Family and non-family firms				Within family firms			
	OLS		IV		OLS		IV	
Variables	Dependent variable: Management							
Family	-0.1002*** (0.0226)	-0.0989*** (0.0221)	-0.2152*** (0.0564)	-0.2127*** (0.0552)	-0.2112*** (0.0627)			
IDV		0.0059** (0.0021)	0.0054** (0.0020)			0.0053** (0.0020)		
Family x IDV			0.0019** (0.0009)	0.0019** (0.0009)	0.0018* (0.0010)			
Family CEO						-0.2827*** (0.0563)	-0.2803*** (0.0548)	-0.2649*** (0.0554)
External CEO						0.1111 (0.0902)	0.1141 (0.0904)	0.1086 (0.0943)
Family CEO x IDV						0.0023** (0.0008)	0.0023** (0.0008)	0.0020** (0.0008)
External CEO x IDV						-0.0006 (0.0014)	-0.0007 (0.0014)	-0.0006 (0.0015)
Education (managers)	0.0033*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)	0.0034*** (0.0004)
Education (non-managers)	0.0042*** (0.0007)	0.0041*** (0.0006)	0.0041*** (0.0006)	0.0040*** (0.0006)	0.0040*** (0.0006)	0.0041*** (0.0006)	0.0040*** (0.0006)	0.0040*** (0.0006)
Log Firm employment	0.1413*** (0.0117)	0.1410*** (0.0117)	0.1414*** (0.0116)	0.1420*** (0.0117)	0.1420*** (0.0112)	0.1391*** (0.0115)	0.1398*** (0.0115)	0.1397*** (0.0111)
Continent FE	YES	YES	YES	NO	NO	YES	NO	NO
Country FE	NO	NO	NO	YES	YES	NO	YES	YES
Observations	7878	7878	7878	7878	7878	7878	7878	7878
Adjusted R-squared	0.265	0.266	0.267	0.267	0.088	0.270	0.270	0.093
Hansen overidentification test (p-value)					0.835			0.610

Notes. Robust standard errors clustered at country level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include country-specific time trends, time dummies and industry-sector fixed effects. *Instruments.* Columns (5) and (8) are instrumental variable estimates of specifications in columns (4) and (7). The set of instruments includes No Pronoun Drop from [Tabellini \(2008\)](#) and Genetic Diversity (ancestry adjusted) from [Ashraf and Galor \(2013\)](#). In column (5), we instrument Family x IDV with our set of instruments interacted with Family. In column (8), we instrument the interactions between Family CEO, External CEO and IDV with our set of instruments interacted with Family CEO and External CEO. Further details on the first stage estimates are available in [Appendix B](#).

Figure 9: Predictions and marginal effects, by individualism (Ref. Col. 3, Table 1)



(a) Predictions of family and non-family firms for different levels of individualism (b) Marginal effects with 95% CIs for different levels of individualism

tor²⁷. In particular, we instrument $Family \times IDV$ with two variables, the use of pronouns in the country's language and the genetic diversity of local population, both interacted with $Family$. As shown by Licht et al. (2007) and Tabellini (2008), language structures with strict rules governing the use of first and second pronouns are correlated to cultural traits emphasizing individualism. Hence, we use the dummy variable *No Pronoun Drop* that equals 1 if the rule forbidding first person pronoun drop is operative and 0 otherwise, expecting it to be positively correlated with IDV , while being uncorrelated with the error term ε in (28)²⁸. Our second instrument is *Genetic Diversity*, measured by the predicted genetic diversity (ancestry adjusted) as computed in Ashraf and Galor (2013)²⁹. The assumption here is that the genetic diversity of the country's population is a cause of cultural diversity which has a direct negative impact on the capacity to build wide network of connections among individuals, and makes the social structure and the people's cultural attitudes more individualistic. In this view, *Genetic Diversity* should have a direct impact on the IDV index, while it should have no direct effect on the firm level management practice scores³⁰.

From the first stage regressions, reported in Table B.2 in the Appendix, both instruments have the expected sign and are powerful predictors of $Family \times IDV$ as testified by their statistical significance and the value of the F-statistics well beyond the threshold of 10 tabulated by Stock and Yogo. The high p-value of the overidentification test confirms the validity of the excluded instruments. Finally, the estimated coefficients for $Family$

²⁷We also ran IV estimates of model (3).

²⁸Data on *No Pronoun Drop* is drawn from Tabellini (2008).

²⁹As explained by the authors, *Genetic Diversity* is constructed as "the expected heterozygosity (genetic diversity) of a country's population, predicted by migratory distances from East Africa (i.e., Addis Ababa, Ethiopia) to the year 1500 CE locations of the ancestral populations of the country's component ethnic groups in 2000 CE, as well as by pairwise migratory distances between these ancestral populations". For further details, see Ashraf and Galor (2013).

³⁰In unreported regressions, we checked that *Genetic Diversity* has no significantly direct effect on management practices in specifications both with and without country fixed effects (in the former case, as usual, we can identify only the interaction between Family and Genetic Diversity).

and $Family \times IDV$ keep their sign, magnitude and significance broadly unaltered.

The last three columns report the estimation results for model (29) where we split the dummy *Family* into two dummies, *Family CEO*, assuming value one when the CEO of the family firm is a family member and zero otherwise, and *External CEO*, assuming value one when the CEO is recruited outside the family. Columns (6)-(8) show that the coefficients for *Family CEO* and its interaction with *IDV* are always significant and with the same signs as for *Family* in model (28), while *External CEO* and *External CEO* $\times$ *IDV* are never significant. To the extent that family members are at an advantage in exploiting the web of family social contacts and relationships, and, in contrast, professional CEOs rely on their entrepreneurial human capital, consistently with the theoretical predictions (*Hypothesis 3*), our findings suggest that: (i) the negative management gap between family and non-family firms are entirely due to those family firms that take advantage of family connections, and the gap is increasing with the importance of connections in society; (ii) family firms which invest in the human capital of professional leaders are indistinguishable from other firms independent of the degree of collectivism of society and the productivity of family connections.

7.2 Connections, management practices and income per capita

At the aggregate level, according to *Hypothesis 4*, the misallocation of the individuals' innate talent induced by the productivity of family connections causes lower growth rates and levels of per capita income in steady state (*Hypothesis 4*). While the scant number of countries and periods covered by the WMS prevent us from testing this prediction properly, Figure 10 provides descriptive evidence consistent with our theory³¹. Namely, it illustrates the positive and significant correlation between the logarithm of the average annual GDP per capita from 2000 to 2010 and the predicted management values from column (5) in Table 1, after controlling for several country characteristics such as Years of Schooling, Corruption, Rule of Law, Family Ties, Trust, Ethnic, Linguistic and Religious Fractionalization³².

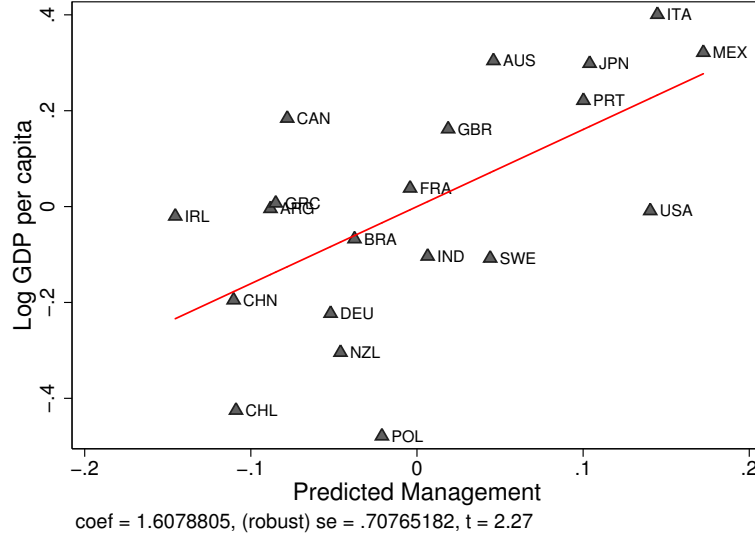
8 Discussion

In this final section we briefly discuss the robustness of our two key theoretical results of polarization of talent allocation and managerial practices across family firms and of the existence of the entrepreneurial regime and crony regime to the removal of two major simplifying assumptions in the basic set-up.

³¹A positive correlation between innovation growth rates, level of steady state GDP per capita and individualism is found by Gorodnichenko and Roland (2010) and Fogli and Veldkamp (2012). Moreover, Gennaioli et al. (2013) document entrepreneurial human capital is strongly correlated with the level of GDP.

³²Figure 10 plots the conditional correlation coefficient relative to column (5) of Table B.5 in the Appendix.

Figure 10: Predicted management and GDP per capita



Partial correlation of the logarithm of the average value of per-capita GDP from 2000 to 2010 and the predicted management values from column (5) in Table 1, controlling for Years of Schooling, Corruption, Rule of Law, Family Ties, Trust, Ethnic, Linguistic and Religious Fractionalization and continent fixed effects.

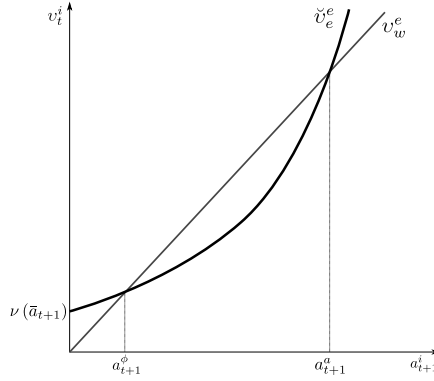
8.1 Managerial capital

A concern with our basic model may arise with regard to the assumptions of perfect substitutability and separability between family connections and entrepreneurial human capital for the accumulation of managerial capital introduced in equation (5). While these assumptions simplify the analysis, our results are robust to more general functional forms for the managerial capital that allows for complementarity between the two factors, with the only restriction of assuming that family connections warrant a minimum level of profits to the family firm, regardless of the innate talent of the leader. In particular, equation (5) can be replaced by the following general specification:

$$m_{t+1}^i = m \left(C_{t+1}^f, E_{t+1}^i \right), \quad (30)$$

where $C_{t+1}^f = \phi(1 - g_{t+1})\tau_{\phi,t}$ and $E_{t+1}^i = a_{t+1}^i\tau_{a,t}$ denote family connections and individual entrepreneurial human capital, respectively, with $m(C_{t+1}^f, 0) > 0$, $m_C > 0$, $m_E > 0$ and $m_{CE} > 0$. Equation (30) assumes that the higher the entrepreneurial human capital acquired by the descendants, the stronger is the productivity of family connections. In this case, the maximum utility of parent entrepreneurs described by the piecewise function (12) is replaced by the convex function $\check{v}_e^e$. However, the existence of a positive lower bound of managerial capital ensured by the network of family connections still leads parent entrepreneurs of low-talented heirs to continue the firms within the family, without affecting the polarization result (Figure 11).

Figure 11: Entrepreneurs' occupational choice



8.2 Professional managers

Throughout the analysis we excluded the possibility of keeping the ownership of the firm within the family, while passing its leadership to professional managers external to the family.

Assume now that this alternative is open to parent entrepreneurs. In order to maintain the hypothesis that the web of social, economic and political relationships are embedded in the family and non-tradeable, assume that external managers cannot exploit family connections (Chung and Luo, 2013), and that their managerial skills reflect only the entrepreneurial human capital accumulated in childhood. Further, assume that professional managers are paid a share ψ of the profits they contribute to generate, while the residual part, $1 - \psi$, accrues to the firm owners as dividends. A possible interpretation is that professional managers are offered incentive contracts that depend on the performance of the firm (Bandiera et al., 2015) and ψ reflects their bargaining power. Alternatively, ψ can be viewed as the maximum rent that external managers can steal due to agency problems (Caselli and Gennaioli, 2013).

In this setting, the existence of a market for managers is related to the existence of sunk costs of startup κ needed to establish a new individual enterprise. Indeed, when firms can be installed at no cost, for any $\psi < 1$, workers' descendants find starting up their own company or working for a wage always more rewarding alternatives than being employed as a professional manager in a family firm. In this case the market for managers is inactive and the model is identical to the basic one.

In contrast, when we admit the existence of setup costs, the managerial career may turn out to be more rewarding than the establishment of a new firm. In particular, it can be verified that, if $\kappa > 0$, there exists a threshold value $\bar{\psi}$ of the share of the profits captured by the external managers such that, for any $\psi > \bar{\psi}$ a supply of managerial services arises, coming from the most or mid-talented workers' descendants according to whether $\bar{\pi}$ is lower or greater than $\kappa/(1 - \psi)$, where $\bar{\pi}$ is the profit attainable by the most talented individual³³. On the other side of the market, the demand for managerial services

³³Interestingly, if $\bar{\pi} < \kappa/(1 - \psi)$, the equilibrium would be characterized by no entry of new individual

depends on the occupational choices of parent entrepreneurs that are now governed not only by the productivity of family connections, but also by the share of profit ψ which they have to relinquish in order to hire a professional manager. First, it immediately follows that for $\psi = 1$ there is no demand for external managers. Then, for continuity there exists a threshold value $\hat{\psi}$ such that, for any $\psi < \hat{\psi}$, a positive demand for professional managers emerges, coming from parents of the marginal heirs, namely those heirs with an innate ability close to the indifference thresholds a^ϕ and a^a .

Hence, the development of a market for managers does not exclude that the polarization in the talent of family-member successors and managerial practices may emerge in equilibrium. Indeed, it is possible to verify that, for any $\psi > \bar{\psi}$, an equilibrium with polarization exists³⁴. Similarly, two different regimes of the economy may prevail in the long run depending on the strength of the productivity of the family connections. In both regimes, however, the aggregate effects of the opening of the market for professional managers on the size of the industrial sector and on growth rates are ambiguous. On the one hand, the inflow of highly talented educated managers can ensure a larger number of firms and higher growth rates with respect to the basic setup. On the other, the existence of fixed startup costs discourages the establishment of new firms, shrinking both the size of the firm sector as well as the growth rate of the economy.

9 Conclusions

Family firms are an enduring player in capitalist economies. In spite of a well established tradition in economics and business history predicting their irreconcilability with industrial progress, they still maintain a major role even in advanced economies.

From a careful reading of historical and empirical research it clearly emerges that the family firm is a heterogeneous entity in several respects – managerial practices, entrepreneurial human capital, economic performance and adherence to family values –, and that its evolution over time differs according to the social, cultural and institutional structure of the country in which they operate. In some cases, family firms have been able to evolve into managerial companies, by carefully planning leadership succession and training new generations of managers. In others, the existence of family-based economic elites has produced cronyism, rent-seeking, social immobility and strong macroeconomic inefficiencies. Moreover it is also clear that the evolution of family firms and their predominance in industry are mutually intertwined with the growth of aggregate technology and the economy.

firms but by the social mobility of workers' descendants choosing the managerial career. If $\bar{\pi} > \kappa/(1 - \psi)$, the most talented descendants of workers will establish new enterprises, the medium talented will be professional managers, while the least talented will supply their general human capital on the labor market.

³⁴A formal proof is available upon request. That said, the main argument can be intuitively explored as follows. An equilibrium with professional managers can exist if and only if $\hat{\psi} > \bar{\psi}$. Then, for any $\psi \in [\bar{\psi}, \hat{\psi}]$, an equilibrium with polarization emerges with a share of workers' descendants employed as professional managers in the firms owned by the heirs. Otherwise, for any $\psi > \hat{\psi}$, no market for managers opens and the model collapses to the basic one.

In this paper we presented a theoretical model that can accommodate the heterogeneity of family firms, their different evolution according to the social structure of the society and their different effects on the development of the economy. These results are obtained by recognizing the paramount role played by entrepreneurial human capital in the advancement of technology, on the one hand, and, as suggested by [Bertrand and Schoar \(2006, p. 96\)](#), by “taking seriously the “family” part of family firms”, on the other hand. Indeed, we admit that entrepreneurial talent is one of the major factors that explain the ability of firms to innovate and introduce new ideas in the economy, but we also recognize the economic benefits deriving from political and economic connections that can be built up by the family generation by generation. Such family connections produce private benefits for family firm successors, by assuring a sufficiently high level of profits even in the case of low talent. According to the institutional and cultural setting of society, the economy can therefore converge toward an entrepreneurial or crony equilibrium. In the first case, family firms polarize into two groups of well managed and well performing firms, relying on the entrepreneurial human capital of the leader successor, and of badly managed firms, doing business thanks to the network of family connections. However, the share of family and new founded firms relying on entrepreneurial human capital is high enough to assure a positive growth rate of technology, which is much higher, the lower is the importance given to family relationships from the economy. In a crony equilibrium, instead, the value of family connections is especially high relative to the productivity of the entrepreneurial human capital, leading to a fully immobile and a zero-growth economy, dominated by an oligarchy of family firms with strong political, economic and social connections.

During the industrialization process, family firms not necessarily evolve according to the traditional boost-retardation line repeatedly suggested in the business history and economic literature, but their evolution can follow many different patterns, as recently argued by the so-called revisionist business historians ([Colli, 2003](#); [Blackford, 2008](#)). In particular, our theory identifies an alternative pattern of development for family firms from small, non-entrepreneurial units to larger companies, giving rise to a managerial take-off and to technology advancements or, otherwise, impeding any mobility and development of society. In this case, strong community and political connections of family firms can be helpful in the short run, sustaining productivity and income, even if they depress long-run growth prospects, delaying or blocking the shift toward more sophisticated forms of management practices.

We then provided empirical evidence consistent with the main predictions of the theory. Namely, we found that on average family firms use worse management practices than non-family firms, but we also found that this gap is higher in societies attributing a great importance to community relationships and it is entirely due to those family firms relying on family connections by leaving the leadership to family members. Finally, we documented a positive correlation between the average quality of firm management practices and the level of development.

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Appendix

A Proofs

Proof of Proposition 1

From Lemma 1 and Lemma 2, and using the maximum utilities in (12) and (14), it follows that:

Regime I (Entrepreneurial society) (a) $w_{t+1} < \hat{w} \implies a_{t+1}^\phi > a_{t+1}^a$, which implies that $v_{e,\phi}^e > \max\{v_w^e, v_{e,a}^e\}$ for $a_{t+1}^i < \bar{a}_{t+1}$, while $v_{e,a}^e \geq \max\{v_w^e, v_{e,\phi}^e\}$ for $a_{t+1}^i \geq \bar{a}_{t+1}$; (b) $w_{t+1} \in [\hat{w}, \tilde{w}] \implies a_{t+1}^\phi < a_{t+1}^a < 1$, which implies that $v_{e,\phi}^e \geq \max\{v_w^e, v_{e,a}^e\}$ for $a_{t+1}^i \leq a_{t+1}^\phi$, $v_{e,a}^e \geq \max\{v_w^e, v_{e,\phi}^e\}$ for $a_{t+1}^i \geq a_{t+1}^a$, while $v_w^e > \max\{v_{e,\phi}^e, v_{e,a}^e\}$ for $a_{t+1}^i \in (a_{t+1}^\phi, a_{t+1}^a)$; (c) $w_{t+1} > \tilde{w} \implies a_{t+1}^\phi < 1 < a_{t+1}^a$, which implies that $v_{e,\phi}^e \geq v_w^e$ for $a_{t+1}^i \leq a_{t+1}^\phi$.

Regime II (Crony society) (a) $w_{t+1} < \hat{w} \implies a_{t+1}^\phi > 1$, which implies that $v_{e,\phi}^e \geq v_w^e$ for $a_{t+1}^i \in [0, 1]$; (b) $w_{t+1} > \hat{w} \implies a_{t+1}^\phi < 1$, which implies that $v_{e,\phi}^e \geq v_w^e$ for $a_{t+1}^i \leq a_{t+1}^\phi$, while $v_{e,\phi}^e < v_w^e$ for $a_{t+1}^i > a_{t+1}^\phi$.

Proof of Proposition 2

Using (17) and (18), it follows that: (a) $w_{t+1} \leq \tilde{w} \implies a_{t+1}^a \leq 1$, which implies that $v_e^w \geq v_w^w$ for $a_{t+1}^i \geq a_{t+1}^a$; (b) $w_{t+1} > \tilde{w} \implies a_{t+1}^a > 1$, which implies that $v_e^w < v_w^w$ for $a_{t+1}^i \in [0, 1]$.

Proof of Proposition 3

Entrepreneurial society. Given the exogenous growth rate assumption, $g_{t+1} = g$, let $\bar{a}_{t+1} = \bar{a}$. Using (21) and (22), solving the integrals, the aggregate human capital supply and demand are given by:

$$H_{t+1}^{S,E} = \frac{\tau_h^p}{2} \times \begin{cases} (1 - n_t)(a_{t+1}^a)^2 & \text{if } w_{t+1} < \hat{w} \\ (a_{t+1}^a)^2 - n_t(a_{t+1}^\phi)^2 & \text{if } w_{t+1} \in [\hat{w}, \tilde{w}] \\ 1 - n_t(a_{t+1}^\phi)^2 & \text{if } w_{t+1} > \tilde{w} \end{cases}, \quad (\text{A.1})$$

and

$$H_{t+1}^{D,E} = \Xi \times \begin{cases} (1 + \alpha)^{-1} \left\{ n_t \bar{a}^{(1+\alpha)/\alpha} + \alpha \left[1 - (1 - n_t)(a_{t+1}^a)^{(1+\alpha)/\alpha} \right] \right\} & \text{if } w_{t+1} < \hat{w} \\ n_t a_{t+1}^\phi \bar{a}^{1/\alpha} + \frac{\alpha}{1 + \alpha} \left[1 - (a_{t+1}^a)^{(1+\alpha)/\alpha} \right] & \text{if } w_{t+1} \in [\hat{w}, \tilde{w}] \\ n_t a_{t+1}^\phi \bar{a}^{1/\alpha} & \text{if } w_{t+1} > \tilde{w} \end{cases}, \quad (\text{A.2})$$

where $\Xi \equiv [(1 - \alpha)\tau_{e_j}^p A_{t+1} w_{t+1}^{R-1}]^{1/\alpha}$, with $e_j = \{a, \phi\}$. Substituting (19) and (20) into (A.1) and (A.2), the equilibrium wage schedule is:

$$w_{t+1}^E = \begin{cases} \theta^\alpha A_{t+1} \left[\frac{\alpha + n_t \bar{a}^{(1+\alpha)/\alpha}}{\chi(1 - n_t)} \right]^{\frac{\alpha(1-\alpha)}{1+\alpha}} \equiv \omega_1^E(n_t) & \text{if } n_t < \hat{n} \\ \omega_2^E(n_t) & \text{if } n_t \in [\hat{n}, \tilde{n}] \\ \theta^\alpha A_{t+1} \bar{a} \left[\frac{(1 + \chi)n_t}{\chi - \alpha} \right]^{\alpha/2} \equiv \omega_3^E(n_t) & \text{if } n_t > \tilde{n} \end{cases}, \quad (\text{A.3})$$

where $\omega_2^E(n_t)$ is the wage w_{t+1} implicitly defined by the function:

$$\Omega(w) = \mu \left(\frac{w_{t+1}}{A_{t+1}} \right)^{\frac{1+\alpha}{\alpha(1-\alpha)}} - \rho n_t \bar{a}^{\frac{2}{\alpha}} \left(\frac{A_{t+1}}{w_{t+1}} \right)^{\frac{1}{\alpha}} - \sigma = 0, \quad (\text{A.4})$$

with $\mu \equiv [\tau_h^p (2\theta^{2\alpha/(1-\alpha)})^{-1}] + [\alpha \left((1 - \alpha)\tau_{e_j}^p \right)^{1/\alpha}][(1 + \alpha)\theta^{(1+\alpha)/(1-\alpha)}]^{-1}$, $\rho \equiv \theta[(1 - \alpha)\tau_{e_j}^p]^{1/\alpha} + 2^{-1}\theta^2\tau_h^p$, $\sigma \equiv \alpha[(1 - \alpha)\tau_{e_j}^p]^{1/\alpha}(1 + \alpha)^{-1}$, and where $\hat{n}$ and $\tilde{n}$ correspond to the number of firms such that the equilibrium wage rate is equal, respectively, to $\hat{w}$ and $\tilde{w}$:

$$\hat{n} = \frac{\chi \bar{a}^{(1+\alpha)/\alpha} - \alpha}{\bar{a}^{(1+\alpha)/\alpha} (1 + \chi)}, \quad (\text{A.5})$$

$$\tilde{n} = \frac{\chi - \alpha}{\bar{a}^{2/\alpha} (1 + \chi)}, \quad (\text{A.6})$$

where $\chi \equiv \alpha(\mu\theta^{2/(1-\alpha)})(\sigma\theta)^{-1}$ and $1 + \chi \equiv \alpha\rho(\sigma\theta)^{-1}$. From (A.3), $\omega_1^E(n_t)$ and $\omega_3^E(n_t)$ are single-valued functions and a unique equilibrium exists. Rewriting (A.4) as

$$\Omega_l(w) \equiv \mu \left(\frac{w_{t+1}}{A_{t+1}} \right)^{\frac{1+\alpha}{\alpha(1-\alpha)}} = \rho n_t \bar{a}^{\frac{2}{\alpha}} \left(\frac{A_{t+1}}{w_{t+1}} \right)^{\frac{1}{\alpha}} + \sigma \equiv \Omega_r(w),$$

we have that $\partial\Omega_l(w)/\partial w_{t+1} > 0$ and $\partial\Omega_r(w)/\partial w_{t+1} < 0$, $\Omega_l(\hat{w}) = \mu\theta^{\frac{1+\alpha}{1-\alpha}}\bar{a}^{\frac{1+\alpha}{1-\alpha}} < \sigma + \rho\theta^{-1}n_t\bar{a}^{\frac{1+\alpha}{1-\alpha}} = \Omega_r(\hat{w})$ for any $n_t > \hat{n}$ and $\Omega_l(\tilde{w}) = \mu\theta^{\frac{1+\alpha}{1-\alpha}} > \sigma + \rho\theta^{-1}n_t\bar{a}^{\frac{2}{\alpha}} = \Omega_r(\tilde{w})$ for any $n_t < \tilde{n}$. Hence, $\Omega_l(w)$ and $\Omega_r(w)$ intersect once in $[\hat{w}, \tilde{w}]$.

Crony society. The aggregate supply and demand of human capital are given by:

$$H_{t+1}^{S,C} = \frac{\tau_h^p}{2} \times \begin{cases} (1-n_t)(a_{t+1}^a)^2 & \text{if } w_{t+1} < \tilde{w} \\ (1-n_t) & \text{if } w_{t+1} \in [\tilde{w}, \hat{w}] \\ 1-n_t(a_{t+1}^\phi)^2 & \text{if } w_{t+1} > \hat{w} \end{cases}, \quad (\text{A.7})$$

and

$$H_{t+1}^{D,C} = \Xi \times \begin{cases} n_t\bar{a}^{1/\alpha} + \frac{\alpha(1-n_t)}{1+\alpha} [1 - (a_{t+1}^a)^{(1+\alpha)/\alpha}] & \text{if } w_{t+1} < \tilde{w} \\ n_t\bar{a}^{1/\alpha} & \text{if } w_{t+1} \in [\tilde{w}, \hat{w}] \\ n_t a_{t+1}^\phi \bar{a}^{1/\alpha} & \text{if } w_{t+1} > \hat{w} \end{cases}. \quad (\text{A.8})$$

The equilibrium wage schedule is:

$$w_{t+1}^C = \begin{cases} \theta^\alpha A_{t+1} \left\{ \frac{n_t[\bar{a}^{1/\alpha}(1+\alpha) - \alpha] + \alpha}{\chi(1-n_t)} \right\}^{\frac{\alpha(1-\alpha)}{1+\alpha}} \equiv \omega_1^C(n_t) & \text{if } n_t < \tilde{n} \\ \theta^\alpha A_{t+1} \bar{a} \left[\frac{(1+\alpha)n_t}{(\chi-\alpha)(1-n_t)} \right]^\alpha \equiv \omega_2^C(n_t) & \text{if } n_t \in [\tilde{n}, \hat{n}] \\ \theta^\alpha A_{t+1} \bar{a} \left[\frac{(1+\chi)n_t}{\chi-\alpha} \right]^{\alpha/2} \equiv \omega_3^C(n_t) & \text{if } n_t > \hat{n} \end{cases}, \quad (\text{A.9})$$

where $\tilde{n}$ and $\hat{n}$ correspond to the number of firms such that the equilibrium wage rate is equal, respectively, to $\tilde{w}$ and $\hat{w}$:

$$\tilde{n} = \frac{\chi - \alpha}{\chi - \alpha + (1+\alpha)\bar{a}^{1/\alpha}}, \quad (\text{A.10})$$

$$\hat{n} = \frac{\chi - \alpha}{1 + \chi}. \quad (\text{A.11})$$

From (A.9), ω_{t+1}^C is a single-valued function and a unique equilibrium exists for any n_t .

Proof of Corollary 1

From (A.3), $\partial\omega_1^E(n_t)/\partial n_t > 0$ and $\partial\omega_3^E(n_t)/\partial n_t > 0$ follow immediately; for $\omega_2^E(n_t)$, using the implicit function theorem, it results that:

$$\begin{aligned} \frac{d\omega_2^E(n_t)}{dn_t} &= -\frac{\partial\Omega(w)/\partial n_t}{\partial\Omega(w)/\partial w_{t+1}} = \\ &= \frac{\rho\bar{a}^{2/\alpha}(A_{t+1}w_{t+1}^{-1})^{1/\alpha}}{\mu\left(\frac{1+\alpha}{\alpha(1-\alpha)}\right)\left(\frac{w_{t+1}^{1+\alpha/2}}{A_{t+1}^{1+\alpha/2}}\right)^{\frac{1}{\alpha(1-\alpha)}} + \rho\frac{n_t\bar{a}^{2/\alpha}}{\alpha w_{t+1}}\left(\frac{A_{t+1}}{w_{t+1}}\right)^{\frac{1}{\alpha}}} > 0. \end{aligned} \quad (\text{A.12})$$

From (A.9), it is easy to verify that $\partial w_{t+1}^C/\partial n_t > 0$, for any n_t . Finally, using (A.5)-(A.6) and (A.10)-(A.11) and the positive monotonic relation between w_{t+1}^R and n_t , the remaining part of the Corollary follows straightforwardly.

Proof of Proposition 4

From Propositions 1 and 2 and Corollary 1, the dynamic system governing the evolution of the industrial sector is

$$n_{t+1} = \begin{cases} 1 - (1-n_t)a_{t+1}^a & \text{if } n_t < \hat{n} \\ n_t a_{t+1}^\phi + 1 - a_{t+1}^a & \text{if } n_t \in [\hat{n}, \tilde{n}] \\ n_t a_{t+1}^\phi & \text{if } n_t > \tilde{n} \end{cases}, \quad (\text{A.13})$$

as depicted in Figure 4 in the text. Using (19) and (20) and the equilibrium wage (A.3), it can be written as:

$$n_{t+1} = \begin{cases} 1 - \left(\frac{1-n_t}{\chi^\alpha}\right)^{\frac{1}{1+\alpha}} \left(\alpha + n_t\bar{a}^{1+\alpha/\alpha}\right)^{\frac{\alpha}{1+\alpha}} \equiv n_1^E(n_t) & \text{if } n_t < \hat{n} \\ n_t\theta \left[\frac{\bar{a}A_{t+1}}{\omega_2^E(n_t)}\right]^{\frac{1}{\alpha}} + 1 - \left(\frac{\omega_2^E(n_t)}{\theta^\alpha A_{t+1}}\right)^{\frac{1}{1-\alpha}} \equiv n_2^E(n_t) & \text{if } n_t \in [\hat{n}, \tilde{n}] \\ \left[\frac{(\chi-\alpha)n_t}{1+\chi}\right]^{\frac{1}{2}} \equiv n_3^E(n_t) & \text{if } n_t > \tilde{n} \end{cases}. \quad (\text{A.14})$$

From (A.14), we can prove the following Lemma, which derives the properties of the dynamic system in (A.13) (proof is available upon request).

Lemma A.1. *If $\phi(1 - g) < 1$,*

1. $n_1^E(0) = 1 - (\alpha/\chi)^{\alpha/1+\alpha} \in [0, 1]$; $n_1^E(\hat{n}) > \hat{n}$; $\partial n_1^E / \partial n_t > 0$; $\partial^2 n_1^E / \partial n_t^2 > 0$.
2. $n_2^E(\hat{n}) = n_1^E(\hat{n}) > \hat{n}$; $n_2^E(\tilde{n}) = n_3^E(\tilde{n}) < \tilde{n}$; $\partial n_2^E / \partial n_t > 0$.
3. $\partial n_3^E / \partial n_t > 0$; $\partial^2 n_3^E / \partial n_t^2 < 0$; $n_3^E(1) < 1$.

Existence. Lemma A.1 ensures that the admissible steady state number of firms can only lie in the interval $[\hat{n}, \tilde{n}]$. To see this, note that the law of motion $n_1^E(n_t)$ is increasing, convex and ends in $n_1^E(\hat{n}) > \hat{n}$. In the interval $n_t \in [\hat{n}, \tilde{n}]$, $n_2^E(\hat{n}) > \hat{n}$, $n_2^E(\tilde{n}) < \tilde{n}$ and $n_2^E(n_t)$ is monotonically increasing in n_t ; hence, $n_2^E(n_t)$ must intersect the 45° degree line from above *at least* once, with a slope less than one. Finally, in the interval $n_t \in (\tilde{n}, 1]$, $n_3^E(n_t)$ is increasing, concave and ends in $n_3^E(1) < 1$; hence, it cannot intersect the 45° degree line and there cannot exist any admissible steady state in the interval $n_t \in (\tilde{n}, 1]$.

Uniqueness. From the above, it results that the steady state of the dynamic system in (A.13) must satisfy the solution of the equation $n_2^E(n_E^*) = n_E^*$ in $[\hat{n}, \tilde{n}]$; formally, n_E^* is the solution of the following implicit function:

$$n_E^* = \frac{1 - a^a(n_E^*)}{1 - a^\phi(n_E^*)} \equiv f(n_E^*) \quad (\text{A.15})$$

At the extremes of the interval, $f(n_E^*)$ assumes the values $f(\hat{n}) = 1$ and $f(\tilde{n}) = 0$ since, as follows from (19) and (20), Definition 1 and Lemma 1, $a^\phi(\hat{n}) = \bar{a} = a^a(\hat{n})$, $a^\phi(\tilde{n}) = \bar{a}^{1/\alpha}$ and $a^a(\tilde{n}) = 1$. Further, from (A.15), it derives that:

$$\frac{\partial f(n_E^*)}{\partial n_E^*} = -\frac{1}{(1 - a^\phi(n_E^*))} \frac{\partial a^a(n_E^*)}{\partial n_E^*} + \frac{(1 - a^a(n_E^*))}{(1 - a^\phi(n_E^*))^2} \frac{\partial a^\phi(n_E^*)}{\partial n_E^*} < 0$$

since

$$\frac{\partial a^a(n_E^*)}{\partial n_E^*} = \frac{a^a(n_E^*)}{(1 - \alpha)\omega_2^E(n_E^*)} \frac{d\omega_2^E(n_E^*)}{dn_E^*} > 0$$

and

$$\frac{\partial a^\phi(n_E^*)}{\partial n_E^*} = -\frac{a^\phi(n_E^*)}{\alpha\omega_2^E(n_E^*)} \frac{d\omega_2^E(n_E^*)}{dn_E^*} < 0$$

where $d\omega_2^E(n_E^*)/dn_E^* > 0$ follows from (A.12). Thus, there is a unique fixed point n_E^* of the function $f(n_E^*)$ and hence a unique solution for the equation $n_2^E(n_E^*) = n_E^*$.

Stability. The unique steady state is also globally stable since, as shown above, $n_2^E(n_t)$ intersects the 45° degree line from above, with a slope less than one. Further, at the steady state n_E^* , the distribution of the individuals' abilities is stationary since the thresholds a^ϕ and a^a are independent of A_{t+1} , despite the constant positive growth rate of the technology. Indeed, differentiating (19) and (20) w.r.t. A_{t+1} , it results that:

$$\frac{\partial a^\phi}{\partial A_{t+1}} = \frac{\theta \bar{a}^{\frac{1}{\alpha}}}{\alpha} \left(\frac{A_{t+1}}{w_{t+1}^*} \right)^{\frac{1-\alpha}{\alpha}} \left(\frac{w_{t+1}^* - A_{t+1} \left(\frac{dw_{t+1}^*}{dA_{t+1}} \right)}{w_{t+1}^{*2}} \right) = \frac{a^\phi (1 - \varepsilon_w^A)}{\alpha A_{t+1}} = 0 \quad (\text{A.16})$$

$$\frac{\partial a^a}{\partial A_{t+1}} = \frac{1}{(1 - \alpha)} \left(\frac{w_{t+1}^*}{\theta A_{t+1}} \right)^{\frac{1-\alpha}{\alpha}} \left(\frac{A_{t+1} \left(\frac{dw_{t+1}^*}{dA_{t+1}} \right) - w_{t+1}^*}{A_{t+1}^2} \right) = \frac{a^a (\varepsilon_w^A - 1)}{(1 - \alpha) A_{t+1}} = 0 \quad (\text{A.17})$$

where $\varepsilon_w^A = (dw_{t+1}^*/dA_{t+1})(A_{t+1}/w_{t+1}^*) = 1$ is the unitary elasticity of w_{t+1}^* with respect to A_{t+1} , with w_{t+1}^* the equilibrium wage rate of steady state implicitly defined by:

$$\Omega^*(w^*) = \mu \left(\frac{w_{t+1}^*}{A_{t+1}} \right)^{\frac{1+\alpha}{\alpha(1-\alpha)}} - \frac{\rho \bar{a}^{\frac{2}{\alpha}} A_{t+1}^{\frac{1-2\alpha}{\alpha(1-\alpha)}}}{\theta^{\frac{1}{1-\alpha}}} \frac{\left(A_{t+1}^{\frac{1}{1-\alpha}} \theta^{\frac{\alpha}{1-\alpha}} - w_{t+1}^{*\frac{1}{1-\alpha}} \right)}{\left(w_{t+1}^{*\frac{1}{\alpha}} - \theta (\bar{a} A_{t+1})^{\frac{1}{\alpha}} \right)} - \sigma = 0. \quad (\text{A.18})$$

Proof of Proposition 5

The first part has already been proved in Proposition 4. Moreover, using $A_{t+1} = (1 + g) A_t$ in (19), (20) and (A.18), it follows that:

$$\frac{\partial a^\phi}{\partial g} = \frac{a^\phi}{\alpha} \left(-\frac{2g}{1-g^2} - \frac{dw_{t+1}^*}{dg} \frac{1}{w_{t+1}^*} \right) < 0 \quad (\text{A.19})$$

$$\frac{\partial a^a}{\partial g} = \frac{a^a}{(1-\alpha)} \left(\frac{dw_{t+1}^*}{dg} \frac{1}{w_{t+1}^*} - \frac{1}{1+g} \right) < 0 \quad (\text{A.20})$$

since

$$\frac{dw_{t+1}^*}{dg} = -\frac{\partial \Omega^*(w^*)/\partial g}{\partial \Omega^*(w^*)/\partial w_{t+1}^*} \in \left(-\frac{2gw_{t+1}^*}{1-g^2}, \frac{w_{t+1}^*}{1+g} \right),$$

and

$$\frac{\partial a^\phi}{\partial \phi} = \frac{\theta (\bar{a} A_{t+1})^{1/\alpha}}{\alpha \phi w_{t+1}^{*1/\alpha}} \left(1 - \frac{\phi}{w_{t+1}^*} \frac{dw_{t+1}^*}{d\phi} \right) = \frac{a^\phi (1 - \varepsilon_w^\phi)}{\alpha \phi} > 0 \quad (\text{A.21})$$

$$\frac{\partial a^a}{\partial \phi} = \frac{w_{t+1}^{*\frac{\alpha}{1-\alpha}}}{(1-\alpha) \theta^{\frac{\alpha}{1-\alpha}} A_{t+1}^{\frac{1}{1-\alpha}}} \frac{dw_{t+1}^*}{d\phi} = \frac{a^a \varepsilon_w^\phi}{(1-\alpha) \phi} > 0, \quad (\text{A.22})$$

since the elasticity of the steady state wage rate with respect to ϕ (i.e., ε_w^ϕ) is positive and less than one (proof is available upon request).

Proof of Proposition 6

From Propositions 1 and 2 and Corollary 1, the dynamic system governing the evolution of the industrial sector is

$$n_{t+1} = \begin{cases} 1 - (1 - n_t) a_{t+1}^a & \text{if } n_t < \tilde{n} \\ n_t & \text{if } n_t \in [\tilde{n}, \hat{n}] \\ n_t a_{t+1}^\phi & \text{if } n_t > \hat{n} \end{cases} \quad (\text{A.23})$$

as depicted in Figure 5 in the text. Using (19), (20) and the equilibrium wage (A.9), it can be written as:

$$n_{t+1} = \begin{cases} 1 - \left(\frac{1 - n_t}{\chi^\alpha} \right)^{\frac{1}{1+\alpha}} \left[n_t \left((1 + \alpha) \bar{a}^{1/\alpha} - \alpha \right) + \alpha \right]^{\frac{\alpha}{1+\alpha}} \equiv n_1^C(n_t) & \text{if } n_t < \tilde{n} \\ n_t \equiv n_2^C(n_t) & \text{if } n_t \in [\tilde{n}, \hat{n}] \\ \left[\frac{(\chi - \alpha) n_t}{1 + \chi} \right]^{\frac{1}{2}} \equiv n_3^C(n_t) & \text{if } n_t > \hat{n} \end{cases} \quad (\text{A.24})$$

From (A.24), we can prove the following Lemma, which derives the properties of the dynamic system in eq. (A.23) (proof is available upon request).

Lemma A.2. *If $\phi(1 - g) \geq 1$,*

1. $n_1^C(0) = 1 - (\alpha/\chi)^{\alpha/(1+\alpha)} \in [0, 1]$; $n_1^C(\tilde{n}) = n_2^C(\tilde{n}) = \tilde{n}$, $\partial n_1^C/\partial n_t < 0$.
2. $n_3^C(\hat{n}) = n_2^C(\hat{n}) = \hat{n}$; $n_3^C(1) < 1$; $\partial n_3^C/\partial n_t > 0$; $\partial^2 n_3^C/\partial n_t^2 < 0$.

For any $n_t < \tilde{n}$, the economy jumps without transition into the interval $[\tilde{n}, \hat{n}]$ where the condition for existence of the steady state is always verified since $n_2^C(n_t^*) = n_t^*$. For any $n_t > \hat{n}$, instead, the economy features transition dynamics toward the unique steady state $n_t^* = \hat{n}$. Finally, note that for any $n_t^* \in [\tilde{n}, \hat{n}]$, the distribution of the individuals' talent is unique and defined by $a^\phi > 1$ and $a^a > 1$, which implies that there is no social mobility.

Proof of Proposition 7

Entrepreneurial steady state. Assume that $\phi < 1$. We have to prove that the steady state falls in the interval of n such that $a^\phi < \bar{a}^* < a^a < 1$, where $\bar{a}^* = \phi(1 - g_E^*)$. In this case, during the transition, the population proportion of skilled entrepreneurs in the steady state interval is $1 - a_{t+1}^a$, and from the definition in (23),

$$g_{t+1} = 1 - a_{t+1}^a = 1 - \left(\frac{w_{t+1}}{\theta^\alpha A_{t+1}} \right)^{\frac{1}{1-\alpha}}. \quad (\text{A.25})$$

Substituting $1 - g_{t+1}$ from (A.25) into the corresponding equilibrium wage equation (A.4), the wage rate can be rewritten as:

$$w_{t+1}^E = \theta^\alpha A_{t+1} \left[\frac{\alpha}{\chi - (1 + \chi) n_t \phi^{2/\alpha}} \right]^{\frac{\alpha(1-\alpha)}{1+\alpha}}. \quad (\text{A.26})$$

Finally, substituting (A.26) back into (A.25), the growth rate is given by:

$$g_{t+1} = 1 - \left[\frac{\alpha}{\chi - (1 + \chi)n_t \phi^{2/\alpha}} \right]^{\frac{\alpha}{1+\alpha}} \equiv g^E(n_t). \quad (\text{A.27})$$

Hence, the time path of the growth rate $\{g_{t+1}\}_{t=0}^{\infty}$ depends only on the dynamics of the number of firms, $\{n_t\}_{t=0}^{\infty}$. Using (A.27) and Lemma 1, the thresholds (A.5) and (A.6) can be rewritten as:

$$\hat{n} = \frac{\chi \left(\phi^{\frac{1+\alpha}{\alpha}} - 1 \right)}{(1 + \chi) \left(\phi^{\frac{1+\alpha}{\alpha}} - \phi^{\frac{2}{\alpha}} \right)} \quad (\text{A.28})$$

$$\tilde{n} = \frac{\chi - \alpha}{(1 + \chi) \phi^{2/\alpha}} \quad (\text{A.29})$$

From (A.28), it follows that $\hat{n} < 0$ since $\text{sign} | \text{num} | \neq \text{sign} | \text{den} |$. In order for an entrepreneurial society to be active, it must be verified that $\phi(1 - g_{t+1}) < 1$, which, using (A.27), implies:

$$n_t < \frac{\chi - \alpha \phi^{\frac{1+\alpha}{\alpha}}}{(1 + \chi) \phi^{2/\alpha}} \equiv \bar{n}. \quad (\text{A.30})$$

In order for $\bar{n} > 0$, the following must hold:

$$\phi < \left(\frac{\chi}{\alpha} \right)^{\frac{\alpha}{1+\alpha}} \equiv \bar{\phi}, \quad (\text{A.31})$$

with $\bar{\phi} > 1$. $\bar{n}$ and $\bar{\phi}$ identify the new thresholds for which an entrepreneurial society is active.

Using (19), (20), (A.26) and (A.27), we first notice that $a_{t+1}^{\phi} = \phi^{1/\alpha} a_{t+1}^a$ and $\bar{a}_{t+1} = \phi(1 - g_{t+1}) = \phi a_{t+1}^a$. Hence $a_{t+1}^{\phi} < \bar{a}_{t+1} < a_{t+1}^a < 1$ as long as $\phi < 1$ and $n_t < \tilde{n}$. Moreover, for $\phi < 1$, $\bar{n} > \tilde{n}$ so that when $\tilde{n} < 1$ the economy can temporarily lie in the third stage of the entrepreneurial regime (fig. 4c). However, since the dynamic system in this stage is still described by the equation $n_3^E(n_t)$ in (A.14), its properties are equal to those of the exogenous case (Lemma A.1), such that for any $n_t > \tilde{n}$, the economy would return to the steady state interval identified by $n_t \in [0, \tilde{n}]$, since $\hat{n} < 0$.

Then, substituting (A.25) and (A.26) into $n_2^E(n_t)$ (A.14), the corresponding dynamic system describing the evolution of the number of firms in the steady state interval can be written as:

$$n_{t+1} = 1 - \left(1 - \phi^{1/\alpha} n_t \right) \left[\frac{\alpha}{\chi - (1 + \chi) \phi^{2/\alpha} n_t} \right]^{\frac{\alpha}{1+\alpha}} \equiv n^E(n_t), \quad (\text{A.32})$$

with the properties $n^E(0) = 1 - (\alpha/\chi)^{\alpha/(1+\alpha)} \in [0, 1]$, $n^E(\tilde{n}) < \tilde{n}$, $\partial n^E(n_t)/\partial n_t > 0$, $|\partial n^E(n_t)/\partial n_t| < 1$. These properties guarantee that the law of motion $n^E(n_t)$ in (A.32) admits a unique stable steady state $n_E^* : n^E(n_E^*) = n_E^*$, with $g_E^* = g(n_E^*) > 0$.

Crony steady state. When $\phi \geq 1$, we have to distinguish three cases.

1. **Endogenous transition from entrepreneurial to crony regime:** $\phi \in [1, \bar{\phi})$ and $n_t < \tilde{n}_T$.

When $\phi \in [1, \bar{\phi})$, then $a_{t+1}^{\phi} > \bar{a}_{t+1} > a_{t+1}^a$ such that the distribution of firms and workers is not consistent with the growth rate in (A.27), used to derive the thresholds, and the dynamic system of the number of firms in (A.32). Instead, for $\phi \in [1, \bar{\phi})$ and n_t low enough such that $\phi(1 - g_{t+1}) < 1$, formally for $n_t < \bar{n}_T$, where $\bar{n}_T \equiv n : \phi(1 - g_{t+1}) = 1$, the distribution of firms and workers is the one describing the first stage of the entrepreneurial society (fig. 2a and 4a). In particular, this distribution implies that the dynamic systems of the number of firms and of the growth rate are given by:

$$n_{t+1} = 1 - (1 - n_t) a_{t+1}^a, \quad (\text{A.33})$$

and

$$g_{t+1} = n_t(1 - \phi(1 - g_{t+1})) + (1 - n_t)(1 - a_{t+1}^a), \quad (\text{A.34})$$

which, after rearranging, is given by

$$g_{t+1} = 1 - \frac{(1 - n_t) a_{t+1}^a}{1 - n_t \phi}. \quad (\text{A.35})$$

Using (A.33), eq. (A.35) can be rewritten as

$$g_{t+1} = \frac{n_{t+1} - \phi n_t}{1 - \phi n_t}. \quad (\text{A.36})$$

Finally, substituting (A.36) in (A.33), using eq. (20) and the corresponding equilibrium wage $\omega_1^E(n_t)$ in (A.3), the

dynamic system of the number of firms and the growth rate are explicitly given by

$$n_{t+1} = 1 - (1 - \phi n_t) \left[\frac{\alpha(1 - n_t)^{1/\alpha}}{\chi(1 - \phi n_t)^{\frac{1+\alpha}{\alpha}} - (1 - n_t)^{1/\alpha} n_t \phi^{\frac{1+\alpha}{\alpha}}} \right]^{\frac{\alpha}{1+\alpha}} \equiv n^T(n_t), \quad (\text{A.37})$$

and

$$g_{t+1} = 1 - \left[\frac{\alpha(1 - n_t)^{1/\alpha}}{\chi(1 - \phi n_t)^{\frac{1+\alpha}{\alpha}} - (1 - n_t)^{1/\alpha} n_t \phi^{\frac{1+\alpha}{\alpha}}} \right]^{\frac{\alpha}{1+\alpha}} \equiv g^T(n_t). \quad (\text{A.38})$$

Using (A.38) and $\omega_1^E(n_t)$ from (A.3), the thresholds in (19) and (20) can be explicitly written as

$$a_{t+1}^\phi = \phi^{\frac{1}{\alpha}} \left(\frac{1 - n_t}{1 - \phi n_t} \right)^{\frac{1-\alpha}{\alpha}} \left[\frac{\alpha(1 - n_t)^{1/\alpha}}{\chi(1 - \phi n_t)^{\frac{1+\alpha}{\alpha}} - (1 - n_t)^{1/\alpha} n_t \phi^{\frac{1+\alpha}{\alpha}}} \right]^{\frac{\alpha}{1+\alpha}} \quad (\text{A.39})$$

and

$$a_{t+1}^a = (1 - \phi n_t) \left[\frac{\alpha}{(1 - n_t) \left(\chi(1 - \phi n_t)^{\frac{1+\alpha}{\alpha}} - (1 - n_t)^{1/\alpha} n_t \phi^{\frac{1+\alpha}{\alpha}} \right)} \right]^{\frac{\alpha}{1+\alpha}} \quad (\text{A.40})$$

Consistently, $a_{t+1}^\phi > a_{t+1}^a$ holds for $\phi > 1$; moreover, for any $n_t < \bar{n}_T$ such that $\bar{a}_{t+1} < 1$, $a_{t+1}^\phi > \bar{a}_{t+1} > a_{t+1}^a$ holds. The properties of the dynamic system in (A.37) are the following: $n^T(0) = 1 - (\alpha/\chi)^{\alpha/(1+\alpha)} \in [0, 1]$; $n_{t+1} = n_t$ in $n_t = \tilde{n}_T$, that is $n^T(\tilde{n}_T) = \tilde{n}_T$, where, as it follows from the Lemma 1, Lemma 2 and eq. (A.10), $\tilde{n}_T \equiv n : a_{t+1}^a = 1$, and $n_{t+1} \geq n_t$ for any $n_t \leq \tilde{n}_T$; $\partial n^T(n_t)/\partial n_t \geq 0$ for any $n_t \leq \tilde{n}_T$, with $\tilde{n}_T < \bar{n}_T < \tilde{n}_T$. These properties ensure that the law of motion in (A.37) admits a uniquely indeterminate steady state in the interval of the crony society $n_C^* \in [\tilde{n}_T, \hat{n}]$, with the growth rate $g_C^*(n_C^*) = 0$, as $a^a(n_C^*) \geq 1$.

2. Crony path with no transition: $\phi \geq \bar{\phi}$ and $n_t < \tilde{n}_C$.

For any $\phi \geq \bar{\phi}$, the economy is always on the crony path since $\phi(1 - g_{t+1}) > 1$ holds for any n_t ; to see this, notice that at the minimum (maximum) level of n_t (growth rate), $n_0 = 0$ ($g_{t+1} = 1 - (\alpha/\chi)^{\alpha/(1+\alpha)}$), $\phi(1 - g_{t+1}) > 1$. Since the properties of the dynamic system are equal to those of the exogenous case (eqs. (A.23) and (A.24)), the possible steady state n_C^* can only lie in $[\tilde{n}_C, \hat{n}]$, with the law of motion given by $n_{t+1} = n_t$ and the distribution of firms and workers characterized by $a^a \geq 1$, where $\tilde{n}_C \equiv n : a_{t+1}^a = 1$, as follows from Lemma 1, Lemma 2 and eq. (A.10). To prove that for $n_t < \tilde{n}_C$, the dynamic system converges to the steady state interval $[\tilde{n}_C, \hat{n}]$, notice that in this case the distribution of firms and workers is the one described in Fig. 5a, such that

$$n_{t+1} = 1 - (1 - n_t) a_{t+1}^a \quad (\text{A.41})$$

and

$$g_{t+1} = (1 - n_t)(1 - a_{t+1}^a), \quad (\text{A.42})$$

that, using (A.41), can be rewritten as

$$g_{t+1} = n_{t+1} - n_t. \quad (\text{A.43})$$

Finally, substituting (A.43) in (A.41), using eq. (20) and the corresponding equilibrium wage $\omega_1^C(n_t)$ in (A.9), the dynamic system of the number of firms is given by the implicit function

$$n_{t+1} = 1 - (1 - n_t) \left[\frac{(1 + \alpha)n_t \phi^{1/\alpha} (1 + n_t - n_{t+1})^{1/\alpha} + \alpha(1 - n_t)}{\chi(1 - n_t)} \right]^{\frac{\alpha}{1+\alpha}} \equiv n^C(n_t), \quad (\text{A.44})$$

characterized by the following properties: $n^C(0) = 1 - (\alpha/\chi)^{\alpha/(1+\alpha)} \in [0, 1]$; $n_{t+1} = n_t$ in $n_t = \tilde{n}_C$, that is $n^C(\tilde{n}_C) = \tilde{n}_C$; $\partial n^C(n_t)/\partial n_t < 0$. Hence, for any $n_t < \tilde{n}_C$, the economy jumps without transition into the interval $[\tilde{n}_C, \hat{n}]$, with an indeterminate steady state number of firms n_C^* and a growth rate $g_C^* = 0$.

3. Crony path with transition: $\phi \geq 1$ and $n_t > \hat{n}$.

Finally when $\phi \geq 1$, for $n_t > \hat{n}$ it results that the dynamic system is given by the equation $n_3^C(n_t)$ in (A.24), for which Lemma A.2 guarantees that for any $n_t > \hat{n}$ the system converges toward the steady state $\hat{n}$.

Proof of Proposition 8

Using eq. (A.27), we have that:

$$\frac{\partial g_E^*}{\partial \phi} = -\frac{\alpha(1 + \chi)\phi^{2/\alpha}}{1 + \alpha} \left[\frac{\alpha}{\chi - (1 + \chi)\phi^{2/\alpha} n_E^*} \right]^{\frac{\alpha}{(1+\alpha)}} \left[\frac{(\partial n_E^*/\partial \phi) + (2/\alpha)\phi^{-1} n_E^*}{\chi - (1 + \chi)\phi^{2/\alpha} n_E^*} \right],$$

where n_E^* is the solution to the implicit equation:

$$n_E^* = 1 - \left(1 - \phi^{1/\alpha} n_E^*\right) \left[\frac{\alpha}{\chi - (1 + \chi) \phi^{2/\alpha} n_E^*} \right]^{\frac{\alpha}{1+\alpha}}. \quad (\text{A.45})$$

Hence,

$$\frac{\partial g_E^*}{\partial \phi} < 0 \quad \text{since} \quad \frac{\partial n_E^*}{\partial \phi} + \frac{2n_E^*}{\alpha \phi} > 0.$$

Proof of Lemma 3

It directly derives from the proof of Proposition 7 above, differentiating (A.27), (A.38) and (A.43) with respect to n_t .

Proof of Proposition 9

When $\phi < 1$, for each time $t + 1$ and any $n_t \in [0, \tilde{n}]$,

(a.1) The share of family firms is given by:

$$\nu_{t+1}^f = \frac{n_t (a_{t+1}^\phi + 1 - a_{t+1}^a)}{n_{t+1}},$$

and it is increasing in n_t ,

$$\frac{\partial \nu_{t+1}^f}{\partial n_t} = \frac{(\partial a_{t+1}^a / \partial n_t) \phi^{\frac{1}{\alpha}} (1 - n_t) + (1 - a_{t+1}^a)(1 - a_{t+1}^a (1 - \phi^{\frac{1}{\alpha}}))}{n_{t+1}^2} > 0, \quad (\text{A.46})$$

since $\partial a_{t+1}^a / \partial n_t > 0$ from the proof of Proposition 7 above.

(a.2) The share of family firms using family connections is given by:

$$\nu_{t+1}^{f_\phi} = \frac{n_t a_{t+1}^\phi}{n_{t+1}},$$

and it is increasing in n_t ,

$$\frac{\partial \nu_{t+1}^{f_\phi}}{\partial n_t} = \phi^{\frac{1}{\alpha}} \frac{(\partial a_{t+1}^a / \partial n_t) n_t + a_{t+1}^a (1 - a_{t+1}^a)}{n_{t+1}^2} > 0. \quad (\text{A.47})$$

(b.1) The share of family and non-family firms managed employing entrepreneurial human capital is given by:

$$\nu_{t+1}^e = \frac{1 - a_{t+1}^a}{n_{t+1}},$$

and it is decreasing in n_t ,

$$\frac{\partial \nu_{t+1}^e}{\partial n_t} = -\frac{\partial \nu_{t+1}^{f_\phi}}{\partial n_t} = -\phi^{\frac{1}{\alpha}} \frac{(\partial a_{t+1}^a / \partial n_t) n_t + a_{t+1}^a (1 - a_{t+1}^a)}{n_{t+1}^2} < 0. \quad (\text{A.48})$$

(b.2) The entry rate is given by:

$$\nu_{t+1}^{nf} = \frac{(1 - n_t) (1 - a_{t+1}^a)}{n_{t+1}},$$

and it is decreasing in n_t ,

$$\frac{\partial \nu_{t+1}^{nf}}{\partial n_t} = -\frac{(\partial a_{t+1}^a / \partial n_t) (1 - n_t) n_t \phi^{\frac{1}{\alpha}} + (1 - a_{t+1}^a)(1 - a_{t+1}^a (1 - \phi^{\frac{1}{\alpha}}))}{n_{t+1}^2} < 0, \quad (\text{A.49})$$

where, throughout, we use $a_{t+1}^\phi = \phi^{1/\alpha} a_{t+1}^a$ and rewrite $n_{t+1} = 1 - a_{t+1}^a (1 - n_t \phi^{1/\alpha})$.

Finally, for any $n_t > \tilde{n}$, $a_{t+1}^a \geq 1$ and the total number of firms in the economy is $n_{t+1} = n_t a_{t+1}^\phi$; hence, $\nu_{t+1}^f = \nu_{t+1}^{f_\phi} = 1$ and $\nu_{t+1}^e = \nu_{t+1}^{nf} = 0$.

Proof of Proposition 10

It results that $g_{t+1} = 0$ when $n_t > \tilde{n}$ and $\phi < 1$, or $n_t > \tilde{\tilde{n}}$ and $\phi \geq 1$. In particular:

- (a) When $n_t > \tilde{n}$ and $\phi < 1$, or $n_t > \hat{n}$ and $\phi \geq 1$, the distribution of firms is the one depicted in Figures 4c and 5c such that the aggregate per capita income is given by:

$$Y_{t+1} = n_t \int_0^{a_{t+1}^\phi} y_{t+1}^i da_{t+1}^i = \Sigma n_t a_{t+1}^\phi \bar{a}_{t+1}^{\frac{1}{\alpha}}, \quad (\text{A.50})$$

where $\Sigma \equiv \left[(1-\alpha)^{1-\alpha} \tau^e A_{t+1} w_{t+1}^{-(1-\alpha)} \right]^{1/\alpha}$. Using (19), the corresponding equilibrium wage rate $\omega_3^E(n_t) = \omega_3^C(n_t)$ in (A.3) and (A.9), and applying $g_{t+1} = 0$, (A.50) can be rewritten as:

$$Y_{t+1} = \hat{\Sigma} A_t n_t^{\alpha/2} \phi, \quad (\text{A.51})$$

which is linearly increasing in ϕ , with $\hat{\Sigma} \equiv [(1-\alpha)^{1-\alpha} \tau^e]^{1/\alpha} \theta^{-(1-\alpha)} ((\chi - \alpha)/(1 + \chi))^{(2-\alpha)/2}$.

- (b) When $n_t \in [\tilde{n}, \hat{n}]$ and $\phi \geq 1$, the distribution of firms is that depicted in Figure 5b such that the aggregate per capita income is given by:

$$Y_{t+1} = n_t \int_0^1 y_{t+1}^i da_{t+1}^i = \Sigma n_t \bar{a}_{t+1}^{\frac{1}{\alpha}}. \quad (\text{A.52})$$

Using the corresponding equilibrium wage rate $\omega_2^C(n_t)$ in (A.9), and applying $g_{t+1} = 0$, (A.52) can be rewritten as:

$$Y_{t+1} = \bar{\Sigma} A_t n_t^\alpha (1 - n_t)^{1-\alpha} \phi, \quad (\text{A.53})$$

which is linearly increasing in ϕ , with $\bar{\Sigma} \equiv [(1-\alpha)^{1-\alpha} \tau^e]^{1/\alpha} \theta^{-(1-\alpha)} ((\chi - \alpha)/(1 + \chi))^{(1-\alpha)}$.

The second part of the Proposition follows from proving that, for any $n_t > \tilde{n}$, the speed of convergence of n_t toward $\tilde{n}$ (i.e., $a_{t+1}^\alpha = 1$) is decreasing in ϕ . At this end, we determine the speed of convergence by first defining the growth rate of n_t , using the function $n_3^E(n_t)$ in eq. (A.14), as follows:

$$\dot{n} = \frac{n_{t+1}}{n_t} - 1 = \left[\frac{\chi - \alpha}{(1 + \chi)n_t} \right]^{1/2} - 1. \quad (\text{A.54})$$

We log-linearize $\dot{n}$ around $\tilde{n}$, by rewriting eq. (A.54) as a function of $\log n_t$

$$\dot{i} = \frac{n_{t+1}}{n_t} - 1 = \left[\frac{\chi - \alpha}{(1 + \chi) e^{\log(n_t)}} \right]^{1/2} - 1 \quad (\text{A.55})$$

and linearizing (A.55) around $\log \tilde{n}$ as follows

$$\dot{i}|_{\log \tilde{n}} \approx \dot{i}|_{\log \tilde{n}} + \left. \frac{\partial \dot{i}}{\partial \log n_t} \right|_{\log \tilde{n}} (\log n_t - \log \tilde{n}). \quad (\text{A.56})$$

From (A.29) and (A.55),

$$\dot{i}|_{\log \tilde{n}} = \phi^{\frac{1}{\alpha}} - 1 \quad (\text{A.57})$$

and

$$\left. \frac{\partial \dot{i}}{\partial \log n_t} \right|_{\log \tilde{n}} = -\frac{\phi^{\frac{1}{\alpha}}}{2} \quad (\text{A.58})$$

such that (A.56) is given by:

$$\dot{i}|_{\log \tilde{n}} = \phi^{\frac{1}{\alpha}} - 1 - \frac{\phi^{\frac{1}{\alpha}}}{2} (\log n_t - \log \tilde{n}). \quad (\text{A.59})$$

Finally, from (A.59) the speed of convergence of n_t toward $\tilde{n}$ is given by:

$$s = \frac{\partial \dot{i}|_{\log \tilde{n}}}{\partial \log n_t} = -\frac{\phi^{\frac{1}{\alpha}}}{2}, \quad (\text{A.60})$$

which is straightforwardly decreasing in ϕ .

Proof of Proposition 11

When $\phi \in [1, \bar{\phi}]$, for each time $t + 1$ and any $n_t \in [0, \tilde{n}_T]$, using (A.41), it follows that:

- (a.1) The share of family firms is given by:

$$\nu_{T,t+1}^f = \frac{n_t}{n_{t+1}},$$

and it increasing in n_t ,

$$\frac{\partial \nu_{T,t+1}^f}{\partial n_t} = \frac{(\partial a_{t+1}^a / \partial n_t) (1 - n_t) + (1 - a_{t+1}^a)}{n_{t+1}^2} > 0. \quad (\text{A.61})$$

(a.2) The share of family firms using family connections is given by:

$$\nu_{T,t+1}^{f\phi} = \frac{n_t \phi (1 - g_{t+1})}{n_{t+1}},$$

and it is increasing in n_t ,

$$\frac{\partial \nu_{T,t+1}^{f\phi}}{\partial n_t} = \phi \frac{(1 - g_{t+1})(1 - a_{t+1}^a) + (\partial a_{t+1}^a / \partial n_t) n_t (1 - n_t)(1 - g_{t+1}) + n_{t+1} n_t (\partial g_{t+1} / \partial n_t)}{n_{t+1}^2} > 0, \quad (\text{A.62})$$

after using from eq. (A.35) $\partial g_{t+1} / \partial n_t = - (a_{t+1}^a (\phi - 1) + (1 - n_t) (\partial a_{t+1}^a / \partial n_t)) / (1 - n\phi)^2$.

(a.3) The share of family and non-family firms managed employing entrepreneurial human capital is given by:

$$\nu_{T,t+1}^e = \frac{n_t (1 - \phi (1 - g_{t+1})) + (1 - n_t) (1 - a_{t+1}^a)}{n_{t+1}},$$

and it converges to zero since, as follows from the proof of Proposition 7 above, a_{t+1}^a and $(1 - g_{t+1})$ are increasing in n_t , with a_{t+1}^a converging to one and $\phi(1 - g_{t+1})$ converging to a value greater than 1.

The remaining part of the Proposition follows directly from the proof of Proposition 7 above.

B Data appendix

B.1 Supplementary tables

Table B.1: Summary statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>Firm level variables (Source: Bloom et al. 2012)</i>					
Management	7878	2.972	0.661	1	4.889
Family	7878	0.196	0.397	0	1
Family CEO	7878	0.157	0.364	0	1
External CEO	7878	0.039	0.194	0	1
Education (managers)	7878	58.800	33.675	0	100
Education (non-managers)	7878	11.198	16.886	0	100
Log Firm employment	7878	5.980	0.970	4.605	8.517
<i>Country level variables (Source: see Appendix B.2)</i>					
IDV	20	57.850	23.643	20	91
No Pronoun Drop	20	0.450	0.510	0	1
Genetic Diversity	20	0.717	0.021	0.667	0.742
Log GDP per capita	20	9.846	0.753	7.841	10.632
Years of Schooling	20	9.630	2.306	3.998	13.154
Institutional Quality	20	1.49E-08	2.369	-4.518	2.696
Corruption	20	0.992	0.982	-0.528	2.366
Rule of Law	20	0.939	0.874	-0.651	1.874
Trust	20	0.337	0.142	0.064	0.635
Family Ties	20	0.009	0.036	0	0.162
Ethnic Fractionalization	20	0.241	0.201	0.012	0.712
Linguistic Fractionalization	20	0.176	0.199	0.018	0.807
Religious Fractionalization	20	0.449	0.252	0.144	0.824

Table B.2: IV - First Stage

	(1)	(2)	(3)
	Family firms	Within the family	
		Dependent variable is:	
Variables	Family x IDV	Family CEO x IDV	External CEO x IDV
Family x No Pronoun Drop	36.0329*** (6.7621)		
Family x Genetic Diversity	285.8078* (158.3765)		
Family CEO x No Pronoun Drop		36.3670*** (6.8037)	0.1238 (0.1672)
Family CEO x Genetic Diversity		284.4311 (168.1231)	-1.2684 (3.7652)
External CEO x No Pronoun Drop		1.1119 (0.7175)	33.4981*** (7.4555)
External CEO x Genetic Diversity		-6.12704 (12.6384)	303.9847** (139.3342)
Family	-161.8923 (110.5987)		
Family CEO		-160.8001 (117.5965)	0.8622 (2.6270)
External CEO		4.2341 (9.0388)	-175.0055* (96.4230)
Education (managers)	0.0022 (0.0015)	0.0015 (0.0014)	0.0008 (0.0010)
Education (non-managers)	-0.0017 (0.0028)	-0.0010 (0.0027)	-0.0008 (0.0007)
Log Firm employment	-0.1686* (0.0890)	-0.1053 (0.0714)	-0.0444 (0.0479)
Country FE	YES	YES	YES
Observations	7878	7878	7878
Adjusted R-squared	0.970	0.969	0.969
F-test of excluded instrument	34.672	39.979	29.134

Notes. The table presents the first stage regressions of the IV estimates in Table (1), columns (5) and (8). Robust standard errors clustered at country level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include country-specific time trends, time dummies and industry-sector fixed effects. *Instruments.* The set of instruments includes No Pronoun Drop from [Tabellini \(2008\)](#) and Genetic Diversity from [Ashraf and Galor \(2013\)](#). In column (1), we instrument Family x IDV with our set of instruments interacted with Family. In columns (2)-(3), we instrument the interactions between Family CEO, External CEO and IDV with our set of instruments interacted with Family CEO and External CEO.

Table B.3: Robustness: proximate causes of development

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variables	Baseline	GDP per capita	Dependent variable: Management								
		Years of Schooling	Institutional Quality	Corruption	Rule of Law						
Family	-0.2127*** (0.0552)	-0.2726* (0.1323)	-0.0068 (0.2552)	-0.1747*** (0.0490)	-0.2051*** (0.0626)	-0.0974*** (0.0216)	-0.2464*** (0.0586)	-0.1200*** (0.0288)	-0.2223*** (0.0515)	-0.1105*** (0.0269)	-0.2330*** (0.0516)
Family x IDV	0.0019** (0.0009)		0.0024** (0.0011)		0.0020** (0.0009)		0.0024** (0.0009)		0.0023** (0.0008)		0.0028*** (0.0010)
Family x Log GDP per capita		0.0178 (0.0146)	-0.0247 (0.0299)								
Family x Years of schooling				0.0083 (0.0064)	-0.0014 (0.0075)						
Family x Institutional Quality						0.0072 (0.0077)	-0.0087 (0.0089)				
Family x Corruption								0.0225 (0.0213)	-0.0147 (0.0234)		
Family x Rule of Law										0.0130 (0.0213)	-0.0402 (0.0261)
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm level controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878
Adjusted R-squared	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267

Notes. Robust standard errors clustered at country level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include country-specific time trends, time dummies and industry-sector fixed effects. Column (1) proposes the regression of column (4) in Table (1) in the text as benchmark. *Log GDP per capita* is the log of the 2000-2010 average real (\$PPP) GDP per capita from Penn World Table (PWT) Version 8.0 (Feenstra et al., 2013); *Years of schooling* is the 2000-2010 average total years of schooling from Barro-Lee v.1.3 (Barro and Lee, 2010); *Institutional Quality* is the first principal component of the 2000-2010 average of the six measures of the World Bank's Worldwide Governance Indicators (Kaufmann et al., 2010), with higher values indicating better functioning institutions. *Corruption* is the 2000-2010 average of the Control of Corruption indicator from Worldwide Governance Indicators; it measures the perception of the control of corruption and it ranges between -2.5 and +2.5, with higher values meaning perception of stronger control of corruption and hence, potentially, lower corruption. *Rule of Law* is the 2000-2010 average of the Rule of Law indicator from Worldwide Governance Indicators; it reflects the effectiveness of the judiciary and the quality of property rights protection, ranging from -2.5 to +2.5, with higher values indicating better institutions. *Firm level controls* are the same as in Table (1) in the text.

Table B.4: Robustness: cultural attitudes and heterogeneity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables	Baseline	Family Ties	Fractionalization									
	Dependent variable: Management											
	Trust			Ethnic			Linguistic			Religious		
Family	-0.2127*** (0.0552)	-0.0950*** (0.0207)	-0.2027*** (0.0582)	-0.1471** (0.0550)	-0.2038*** (0.0607)	-0.0840* (0.0434)	-0.2015*** (0.0679)	-0.0951*** (0.0282)	-0.2092*** (0.0625)	-0.1507** (0.0640)	-0.2100*** (0.0631)	-0.1733** (0.0676)
Family x IDV	0.0019** (0.0009)		0.0017* (0.0009)		0.0021** (0.0010)		0.0018** (0.0009)		0.0019** (0.0009)		0.0020** (0.0009)	0.0026** (0.0010)
Family x Family Ties		-0.0902 (0.0599)	-0.0585 (0.0639)									-0.1107 (0.0718)
Family x Trust				0.1548 (0.1629)	-0.0706 (0.1876)							-0.2187 (0.2066)
Family x Ethnic Frac.						-0.0539 (0.1061)	-0.0367 (0.1149)					0.0174 (0.1985)
Family x Linguistic Frac.								-0.0152 (0.0682)	-0.0172 (0.0563)			0.0311 (0.0994)
Family x Religious Frac.										0.1059 (0.1141)	-0.0269 (0.1275)	-0.0483 (0.1700)
Country FE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Firm level controls	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Observations	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878	7,878
Adjusted R-squared	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267	0.267

Notes. Robust standard errors clustered at country level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include country-specific time trends, time dummies and industry-sector fixed effects. Column (1) proposes the regression of column (4) in Table (1) in the text as benchmark. *Family Ties* measures the strength of family ties and captures beliefs regarding the importance of the family in the respondent's life, the duties and responsibilities of parents and children, and the love and respect for one's own parents (Alesina and Giuliano, 2014). It is measured by extracting the first principal component from three variables of the 1981-2008 waves of the *World Values Survey*. All the responses are rescaled such that higher values indicate stronger family ties. The first question assesses how important the family is in a person's life and can take values from 1 to 4 (with four being very important and 1 not important at all). The second question asks whether the respondent agrees with one of two statements (taking the values of 1 and 2 respectively): (1) One does not have the duty to respect and love parents who have not earned it; (2) Regardless of what the qualities and faults of one's parents are, one must always love and respect them. The third question prompts respondents to agree with one of the following statements (again taking the values of 1 or 2 respectively): (1) Parents have a life of their own and should not be asked to sacrifice their own well being for the sake of their children; (2) It is the parents' duty to do their best for their children even at the expense of their own wellbeing. *Trust* is the fraction of individuals within a given country, that, from the 1981-2008 waves of the *World Values Survey*, responded with "Most people can be trusted" when answering the survey question "Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?". *Ethnic, Linguistic and Religious Fractionalization* are taken from Alesina et al. (2003) and measure the probability that two randomly-selected individuals in a country's population belong to different ethnic, linguistic or religious groups. *Firm level controls* are the same as in Table (1) in the text.

Table B.5: GDP per capita and Predicted Management

	(1)	(2)	(3)	(4)	(5)
Variables	Dependent variable: Log GDP per capita				
Predicted Management	2.4804*** (0.4464)	1.2274** (0.5346)	1.1411* (0.5516)	1.1642* (0.6022)	1.6079* (0.7077)
Years of schooling		0.1601** (0.0553)	0.1486** (0.0667)	0.1775* (0.0846)	0.0639 (0.1115)
Corruption			-0.0903 (0.3806)	0.2109 (0.5194)	-0.4402 (0.7011)
Rule of law			0.1711 (0.3922)	-0.1354 (0.5782)	0.6888 (0.8140)
Family ties				0.3030 (0.6376)	0.1761 (0.5320)
Trust				-0.5672 (0.7653)	0.4186 (0.9379)
Ethnic fractionalization					0.3591 (0.7798)
Linguistic fractionalization					-1.2248 (0.7489)
Religious fractionalization					-0.0937 (0.3135)
Observations	20	20	20	20	20
Adjusted R-squared	0.789	0.858	0.839	0.823	0.814

Notes. Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. All regressions include continent dummies. *Predicted Management* is the country average of the predicted management values from column (5) in Table 1.

B.2 Description and sources of country-level variables

Log GDP per capita is the log of the 2000-2010 average real (\$PPP) GDP per capita from Penn World Table (PWT) Version 8.0 (Feenstra et al., 2013).

Years of schooling is the 2000-2010 average total years of schooling from Barro-Lee v.1.3 (Barro and Lee, 2010).

Institutional Quality is the first principal component of the 2000-2010 average of the six measures of the World Bank’s Worldwide Governance Indicators (Kaufmann et al., 2010), with higher values indicating better functioning institutions.

Corruption is the 2000-2010 average of the Control of Corruption indicator from Worldwide Governance Indicators; it measures the perception of the control of corruption and it ranges between -2.5 and +2.5, with higher values meaning perception of stronger control of corruption and hence, potentially, lower corruption.

Rule of Law is the 2000-2010 average of the Rule of Law indicator from Worldwide Governance Indicators; it reflects the effectiveness of the judiciary and the quality of property rights protection, ranging from -2.5 to +2.5, with higher values indicating better institutions.

Family Ties measures the strength of family ties and captures beliefs regarding the importance of the family in the respondent’s life, the duties and responsibilities of parents and children, and the love and respect for one’s own parents (Alesina and Giuliano, 2014). It is measured by extracting the first principal component from three variables of the 1981-2008 waves of the *World Values Survey*. All the responses are rescaled such that higher values indicate stronger family ties. The first question assesses how important the family is in a person’s life and can take values from 1 to 4 (with four being very important and 1 not important at all). The second question asks whether the respondent agrees with one of two statements (taking the values of 1 and 2 respectively): (1) One does not have the duty to respect and love parents who have not earned it; (2) Regardless of what the qualities and faults of one’s parents are, one must always love and respect them. The third question prompts respondents to agree with one of the following statements (again taking the values of 1 or 2 respectively): (1) Parents have a life of their own and should not be asked to sacrifice their own well being for the sake of their children; (2) It is the parents’ duty to do their best for their children even at the expense of their own wellbeing.

Trust is the fraction of individuals within a given country that, from the 1981-2008 waves of the *World Values Survey*, responded with “Most people can be trusted” when answering the survey question “Generally speaking, would you say that most people can be trusted or that you can’t be too careful in dealing with people?”.

Ethnic, Linguistic and Religious Fractionalization are taken from Alesina et al. (2003) and measure the probability that two randomly-selected individuals in a country’s population belong to different ethnic, linguistic or religious groups.