Entrepreneurial selection with frictions

Stefano Pietrosanti[‡]

Abstract

Abstract. Using aggregate Eurostat and World bank data I show that, first, Italy has twice the number of over-60 managers than the Euro area average; second, Italy has much slower and costlier contract enforcement than other major European economies. Using Bruegel data on European manufacturing firms (EFIGE) I document that only in Italy the presence of an old (over-65) manager is associated with a higher probability of obtaining credit. This is coherent with previous literature findings, highlighting how weak contract enforcement in Italy makes granting credit particularly risky for banks. I argue that this can give rise to an incumbent advantage, explaining at least in part both my finding and the prevalence of old managers in Italy. I describe and investigate this mechanism through a static general equilibrium model of firm allocation; the model explains how incumbent advantage, caused by difficulty in accessing credit for new managers, can sustain firm misallocation. I use this model to determine in which cases the presence of such frictions in access to funding can justify subsidies to new managers/entrepreneurs.

Keywords: Gerontocracy, Contract enforcement, Managers selection, Entrepreneurs selection.
JEL Classification: G3, G32, G38, E6

‡University of Pennsylvania.

* I wish to express my special thanks to Guillermo Ordóñez, Michael Roberts, Alessandro Dovis, Marc Flandreau and Petra Todd for generously providing invaluable guidance throughout the preparation of this work. I wish to express my gratitude to Sara Casella, for extremely insightful discussions. I also wish to thank seminar participants at the University of Pennsylvania Economics Department for their feedback and advice. All errors are my own.

I Introduction

Firms' management and the quality of contract enforcement are two important factors that help explain disparities in growth, innovation, and productivity. Two literatures have studied the economic effects of management (see Bloom and Van Reenen (2010) review) and institutions (see Acemoglu, Johnson, and Robinson (2005), Moser (2013) reviews) in a mostly separate fashion. In this paper, I work on linking these two strands. I contribute in two ways. First, using publicly available firm-level data, I bring novel empirical evidence of a link between managerial selection and contract enforcement through the access to credit; second I use a simple static general equilibrium model of firm allocation to study the mechanics of this potential link, and when its presence can justify policy interventions.

I document the possibility of a link between defective contract enforcement and managerial selection. Using the World Bank "Doing Business" survey, and Eurostat labor data, I highlight the case of Italy, where two anomalies - long expected time to enforce a contract, and a higher presence of old managers - can be observed jointly. First, it takes double the amount of time to solve a commercial dispute in Italy than in any other major European country. Second, Italian firms have approximately 2.3 *times* more over-60 year old CEOs than the firms of other comparable European countries, and such difference cannot be rationalized by differences in the age profile of the population, labor force, or by systematic differences in the entry or exit rates of firms across such countries.

Using Bruegel's firm level survey data (EFIGE survey, Altomonte and Aquilante (2012)), I confirm that the age anomaly is robust to controlling for different firm and regional level characteristics. At present, I lack data allowing me to directly investigate the relationship between the quality of contract enforcement and managerial selection. I do, instead, have information about firms' access to credit, which is strongly affected by a weak enforcement environment (see Jappelli, Pagano, and Bianco (2005) and Schiantarelli, Stacchini, and Strahan (2020)). I thus document a series of robust correlations, which are both economically and statistically significant, and suggestive of a trade-off between management quality and the access to financing when quality of enforcement is bad.

First, it is the case that across all major European countries, old CEOs come with older credit relationships, but more so in Italy; furthermore, only in Italy it is the case that old CEOs come with a higher probability of being granted a loan application. For a subsample of the dataset for which information on the use of external financing is available, I show that there is no evidence that old Italian CEOs invest systematically in less risky projects, implying that the difference in the likelihood of being granted credit appears to be linked directly to CEO's characteristics, and not to firm's or projects'

characteristics. On the other hand, I do also find evidence that such old CEOs come at cost, as firms' with old CEOs tend to list "lack of managerial resources" as a constraint to their growth.

I then present a theoretical investigation of the trade-off highlighted by the descriptive evidence, i.e. the one between adopting a new vintage of human capital,[1] and facing financing and contracting frictions which destroy value. Such trade-off can be summarized in a simple model of a market for the management rights on firms, in the style of Caselli and Gennaioli (2005), building on Lucas Jr (1978)'s framework.[2]

In such model, firms are a production technology that employs human capital and labor to produce the final consumption good. Managers provide the human capital of the firms, while workers provide labor. To manage the firm, a person must own a "license" to operate the technology, and pay the wage of her workers before production is realized. Such working capital constraint forces the managers to borrow funds from a bank, which can be thought of as a foreign, deep-pocketed investor. I consider a case with no uncertainty of any kind, and no default. There are two types of risk-neutral agents in the economy. "Old" people, who originally own licenses, have a lower endowment of human capital, and exogenously borrow at a risk-free rate; "young" people, who can buy licenses, have a higher endowment of human capital, but must borrow at an exogenously higher rate. Such add-on to the price of labor is a shorthand to represent the cost of setting up credit relationships, or more in general a reputation for respecting contracts, in an environment where public contract enforcement is weak. Firm allocation will thus depend on whether the gap in the quality of human capital vintages is high enough to compensate the higher cost of borrowing. A sufficiently higher human capital is such that the young can grant a payment to the old which is large enough to make the old happy to relinquish control and just supply labor in equilibrium. In particular, I show that if the financing friction is the only friction in the economy, the allocation of firms to the young or the old is based on a cutoff rule in the size of the friction *vis-a-vis* the gap in human capital vintages, and the equilibrium is unique.

I then study the equilibrium efficiency properties, establishing three results. First, the equilibrium of the market for control may be wasteful. Which is, it may not coincide with the unconstrained optimum. Old agents do not internalize the general equilibrium

[1] Clearly, we must believe that the new vintage is better for this to be a proper trade-off. As I want to study, in general, when a policy of subsidy can make sense, I will start from the assumption that the new vintage is better. On the matter there is relatively little empirical evidence. For a few examples, Daveri and Maliranta (2007) and Daveri and Parisi (2015), using Finnish and Italian data respectively, find that old managers can arm firm performance in innovative industries, and Kodama and Li (2018) estimate on Japanese data a managerial performance curve, and find it peaks at around 55 years of age.

[2] I stress differences and comment similarities with Caselli and Gennaioli (2005) at the end of this Introduction.

effect of not relinquishing the firm on wages, thus making the equilibrium with allocation of the firm to the young unfeasible even in cases where aggregate consumption implied by such allocation would be higher. Second, this does not grant per se an argument for interventions that a naive reading of the first result would suggest, e.g. subsidies to young entrepreneurs. No tax/subsidy levied *in* equilibrium can improve on it, as long as the planner must respect the same resource and participation constraints as the players in the economy. Third, a simple extension of the model can, instead, grant a range of interventions. If we assume that also the market for control is frictional, in particular that a fraction of the price of the license is lost in the passage from old to young, multiple Pareto-ranked equilibria arise. The economy can be stuck in the equilibrium with lower consumption, while both the low and high consumption equilibria are feasible.[3] Tax/subsidies can be used by a benevolent planner to select the best among feasible equilibria.

The result can be explained following the logic of Greenwald and Stiglitz (1986). The reason for the waste in the equilibrium with only the financing friction is the complementarity in the "relinquishing" action of the old, which causes a large shift in the price of labor (and firms). At the same time, as long as the market for control is frictionless, gain and losses due to the pecuniary externality net out, and this is why the equilibrium cannot be improved upon within the constraints of the economy. The inefficiency in the extended model is, instead, due to the interaction of the two frictions. Again, control allocation affect wages and, through wages, it exerts an indirect effect on the value of the firm. Though, this now affects *differentially* old and young agents, because of the friction in the market for control. The pecuniary externality does not net out, but nobody can individually act on wages to take this asymmetry into account. This justifies how the economy can get stuck in the equilibrium in which the allocation of firms implies the highest waste.

The mechanism I stress in this paper relates to the theoretical grounds of policies subsidizing new entrepreneurs.[4] I highlight how believing that the potential new entrants' "quality" (the human capital endowment in the model) is higher and that they face financing frictions does not *per se* grant an economic argument for a policy of subsidies. I show that in order to sustain a policy of subsidies we must believe that the market for control is frictional in itself.

The rest of the paper is organized as follows. Section II presents aggregate and firm level motivating my interest in the topic and some of the assumption of the modeling

[3]Note, the inefficient equilibrium may involve either the young or the old as managers. It depends on the relative size of the frictions, and the gap in ability between young and old.

[4]Such policies are common both in the developing and developed world, while their effectiveness is debated (see Acs et al. (2016), Åstebro (2017), Fotopoulos and Storey (2019)).

framework; Section III presents the theoretical framework and the policy implications I derive from it; Section IV concludes.

Related literature. The works closest to mine are the theoretical papers by Burkart, Panunzi, and Shleifer (2003), Caselli and Gennaioli (2005), the quantitative papers by Caselli and Gennaioli (2013) and Lippi and Schivardi (2014), and the empirical literature spurred by works such as La Porta, Lopez-de Silanes, and andrei (1999), La Porta et al. (2000). I distinguish myself from the first set of works, which focus on family firms, tackling incumbent advantages in general and shifting my focus on optimal policy. In particular, Caselli and Gennaioli (2005) studies a setting where firm misallocation is caused by an agency problem in the credit market, giving rise to multiple equilibria through the general equilibrium effects on wages too. In my case, the mechanism giving rise to the multiplicity is simpler and exogenous, it is grounded on the add-on to factor prices that only young agents must pay. This is a coarser choice, but gives rise to a simple environment in which there is a potentially efficient justification for allocating the firm to the "less capable" agents, i.e. saving on a friction in the capital market. My contribution is a study of the efficiency properties of the model, discussing policy implications from the perspective of a planner that must respect the same constraints as the agents in the economy. I contribute to the second strand of literature bringing further empirical evidence on the matter, including in our analysis data about small manufacturer, and highlighting the role of access to credit in driving the selection into firms leaderships.

Furthermore, I contribute to the debate about the problem of the Italian economy, and how business leadership contributes to them (Bandiera et al. (2008), Daveri and Parisi (2015), Pellegrino and Zingales (2017), Schivardi and Schmitz (2018)). In particular, and complementary to Pellegrino and Zingales (2017), I point out that even if we do not believe that the prevalence of old managers in Italy is directly linked to lower productivity at the firm level, it can be a relevant indicator of the importance of frictions in the market for funding and control, and it can be linked to overall firm misallocation.

II Motivating evidence

Among the major European economies (France, Germany, Italy, and Spain) the country with the worst enforcement of contracts, Italy, is also an outlier in terms of the share of managers that are over-60 years old. I document this regularity employing two main sources. First, I use Eurostat data for aggregate business and population demographics. Second, to track the quality of enforcement, I use the Doing Business survey by the World Bank. Both sources are publicly available, and data free to download on their websites.

I start from the age distribution of managers across countries. My data source, Eu-

rostat, is the European Union's Directorate General responsible for collecting data and analysis to inform the European institutions. Among other information, it collects firms', workers' and population's demographics, and makes them available by country, age group, profession, role in the firm.

In Figure 1 we can see that, in the second quarter of 2017,[5] Italy had about 2.3 times more over-60 years old managers than the Euro area average.[6] The relative prevalence of old managers in Italy has been documented in Bandiera et al. (2008) and Boeri, Merlo, and Prat (2010). Though, these works tend to stress dispersion in the distribution, whose average is overall similar to the one of other countries. I instead focus specifically on the fat right tail of the age distribution, and I show that it is a persistent regularity across multiple datasets, which cannot be explained by underlaying cross-country demographic differences. First, as shown in Figure 2, such wide discrepancy is not matched by a comparably high discrepancy in the age profile of the entire population. Moreover, it is also not matched by a similar cross-country difference in the share of old workers. Aiyar and Ebeke (2017) show (see Figure 1, p.4 in Aiyar and Ebeke (2017)) that even though the share of old (55-65 years old) workers in Italy at 2016 is around 15 percent, it is below the German figure, and in line with the Euro area average. Finally, also firm demographics appears not to be enough to explain all of the large difference. In Figure 3 and 4 we can see that, even though it is true that in Italy the firm entry and exit rates are among the lowest, the differences with Spain, France and Germany are relatively small, with Germany and France recording respectively the smallest entry rate from 2014 onward, and the smallest exit rate from 2011 onward.

An aspect under which the Italian economy differs as starkly as in the prevalence of old managers, is the time it takes to enforce a contract. This can be observed employing the Doing Business survey by the World Bank. The Doing Business survey is recorded since 2003 by the World Bank; it measures the ease of doing business across different countries (see Besley (2015)). Among other data, the survey collects information on expected time to solve court cases, and the costs involved in using the enforcement services provided by a country's legal system.

In Figure 5 I plot the expected time to conclude a commercial dispute in a major city in each country, as of the opinions of a World Bank selected sample of legal experts and

[5]This is the last date for which Eurostat shows reliable data on number of managers by age class for all the major European economies, and the Euro area average.

[6]Eurostat defines managers as employees that fall within the International Labour Office Major Group 1 definition, i.e. employees who "plan, direct, coordinate and evaluate the overall activities of enterprises, governments and other organizations, or other organizational units within them, and formulate and review their policies, laws, rules and regulations" (ILO (2012), Vol. I, p.87).

judges.[7] Doing this, I can see that the expected time to solve a dispute is about double the European expected time. Such evidence is confirmed in the literature employing different measures of court efficiency. See, for example, Djankov et al. (2003), Giacomelli and Menon (2016), and Drozd and Serrano-Padial (2018). This is relevant for my study, as such low quality enforcement may highly increase the value of connections and soft enforcements through relationship capital.[8] The importance of soft enforcement and the high cost of commercial litigation could then justify an incumbent advantage, and contribute to explain the age profile discrepancy.

Clearly, as the unit of observation is at the country level, recording the coexistence of old managers prevalence, and of very slow contract enforcement is not enough to postulate the above channel. Unfortunately, I lack the data to directly argue a causal chain starting from the quality of enforcement and ending with effects on the allocation of management positions. At the same time though, less direct ways to document correlations supportive of my reasoning can be pursued. Weak enforcement is a general feature of an economy, with many implications. One is, though, particularly salient. It is well documented that, in such economies, granting loans is riskier.

For example, Jappelli, Pagano, and Bianco (2005) shows that, within Italy and controlling for geographic heterogeneity, worse judicial efficiency correlates with lower credit supply and higher measures of credit constraints for businesses; more recently Schiantarelli, Stacchini, and Strahan (2020) shows evidence that Italian the same firm is more likely to default on a bank that is located where legal enforcement is slower, and that credit losses during financial crisis are worsened by this behavior. This is confirmed for the Italian case by the Doing Business survey. Indeed, even though the expected time to resolve an insolvency is in line with the rest of its European peers, Italian insolvency procedures are extremely wasteful (22 percent of the assets involved[9] gets lost in 2017, double the Spanish figure), and the recovery rate on the Euro is 63 percent, 15 percent lower than the second worst performer among the five major countries, France.

If the channel I postulate - weak enforcement is substituted with soft enforcement and

[7] A commercial dispute is defined by the World Bank as a procedure in which firm A necessitates of a legal enforcement procedure to obtained a payment to which firm B was bound by a contract. Cities involved in the surveys are capital cities, in the case of France, Germany and Spain, and an average of major municipalities for the case of Italy. Survey methodology details can be consulted at https://www.doingbusiness.org/en/methodology/enforcing-contracts.

[8] Lippi and Schivardi (2014) present a similar argument in the motivation of their quantitative framework. For a review on the substitutability between formal and informal enforcement, see MacLeod (2007), and for a recent example of a study of how reputation constrains markets when enforcement is lacking see Macchiavello and Morjaria (2015). In a fully dynamic environment, this reasoning is valid under the assumption that the cost of screening new relationships in a weak enforcement setting is higher than the one implied by the higher attractiveness of default for an old agent.

[9] The World Bank defines the assets involved as the debtor's estate, which encompasses the debtor's assets that are garnishable.

reputation built through time is particularly valuable - is indeed at play, we should expect to observe it at play in the access to credit of firms. Which is, we should observe for Italian firms, and only for them, ease in credit conditions coming with older management. To do this, I use a publicly available survey of European manufacturers collected by Bruegel, in its expanded version including balance sheet information. Through this I do show that the expected correlation is present, and that, more in general, a trade-off between firm-growth and access to financial resources appears at play only in the Italian case. This is clearly a second best with respect of showing empirically that weak enforcement actually causes these regularities I observe, a task which I leave to further work.

II.1 Firm level evidence from EFIGE

The EFIGE (European Firms in a Global Economy) dataset is a detailed survey of 14,759 manufacturers from Austria, France, Germany, Hungary, Italy, Spain, and the United Kingdom (Altomonte and Aquilante (2012), which also includes extensive description). Data refer to the year 2007, and include information of firms' employment, operation, ownership structure, management structure, credit access and use of external resources. The survey is anonymized and includes sampling weights to be representative of the underlying national population of firms.[10] I employ the version of the dataset augmented with information from Bureau van Dijk's Amadeus, a balance sheets database covering European firms.[11]

Following Piguillem and Rubini (2019) and Steinberg (2019), I drop observations for Austria and Hungary, which have worst data coverage, and I focus on a resulting sample of 13,771 observations. The dataset restricts information on the management to each firm's CEO, which often coincides with the business owner for smaller firms. The sample characteristics are described in Table 1; I have information regarding CEO age bracket (10 years brackets), her relationships to the owners, whether the firm is owned by foreigners, whether it is active abroad, and whether the firm was born before 1976 (Old Firm dummy); for about 12,000 observations, I can observe firms' total assets, liquidity ratio, and the answer to a questionnaire asking to the respondent within the firm whether they perceive that management or accessing to finance pose a constraint to growth;[12] for about 10,000 observations, I can observe number of employees, and EBITDA; for a more restricted subset of the dataset, I can finally observe the age of the relationship with the

[10] In all the regressions result reported, I do employ the sampling weights provided.

[11] The dataset has been employed, among others, by Pellegrino and Zingales (2017) to investigate the reasons for the Italian economic stagnation, by Steinberg (2019) to track the effects of Brexit, and by Piguillem and Rubini (2019) to track the interaction between barriers to firm growth and export.

[12] Other possibilities are listed, as bureaucracy, but fall beside the scope of this paper. As the survey is anonymous, I cannot access to the role of the respondent within the firm, nor to any summary statistic or break-down regarding it.

main bank (6,000 observations), whether the firm was denied a credit application, and how it used external funding[13] (2,500 observations).

First of all I set to verify whether the regularities observed in the aggregate data for managers in general do hold also in the firm level data for CEOs. In Figure 6 I observe that the fatter right tail of the age distribution is common between the two data sources. To verify that firm heterogeneity cannot explain away the large numbers of old CEOs in Italy, as a next step I explore differences in the relationship between the old age of CEOs and the five country dummies, as I progressively saturate a regression with controls.

The relationship I estimate takes the form

$$\text{CEO Older than } 65_{fc} = \alpha + \sum_{c} \beta_c \text{Country Dummies}_{fc} + \Gamma X_{fc} + \epsilon_{fc} \tag{1}$$

where CEO Older than 65_{fc} is a dummy taking value 1 if firm f, located in country c, is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Country Dummies_{fc}, dummies equal 1 if firm f is located in country $c \neq$ Germany. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class fixed effects (FEs); ϵ_{fc} is the heteroscedasticity robust standard error.

In Table 2 I present the findings. In the first column, I observe that the fraction of over-65 CEOs is about 9 percent in Germany, with Spain and France showing younger CEOs on average, the United Kingdom slightly older CEOs, and Italy a striking 21 percent of over-65 CEOs.[14] As sequential robustness test, I start adding (column 2) the region, industry, and size class FEs; then the firm level dummies tracking firm's foreign operation, ownership structure, and age; then the balance sheets controls (column 3). We can see that, upon the addition of the balance sheet controls (column 4), only the Italian dummy's coefficient stays large and significant. This implies that for the firm for which we have balance sheet information, firm characteristics explain to a large extent the correlation between CEO's old age in all countries except for Italy, substantiating the robustness of the previous stylized fact.

[13] External funding uses recorded include 1) the increase of the scale of production, 2) in or 3) out of sector acquisitions, 4) funding working capital, 5) optimizing the funding mix.

[14] Though, it must be noticed that also the standard deviation is double in the Italian case, which reconciles my stylized fact with the finding that the average Italian CEO age is not extremely different from her European peers (Bandiera et al. (2008))

Second, I show that there is evidence to believe that only in Italy there is an old-CEO – access-to-financial-resources trade-off. The first piece of evidence I present comes from estimating the following linear regression for all countries but Italy, and, separately, for Italy.

$$\begin{aligned} &\text{CEO Older than } 65_{fc} = \alpha + \beta \text{Managerial Constraint}_{fc} \\ &+ \omega \text{Financial Constraint}_{fc} + \Gamma X_{fc} + \epsilon_{fc} \end{aligned} \tag{2}$$

where α is a common intercept; Managerial Constraint$_{fc}$ is a dummy equal to one if, in the answer to the survey, firm's f respondent claimed that lacking managerial resources constrain the growth of the firm; Financial Constraint$_{fc}$ is an equivalent dummy, if financial resources are mentioned as a constraint growth; X_{fc}; the X_{fc} matrix includes the same variables as in Equation 1, plus, whenever the specification is estimated on all countries but Italy, a Country * Industry FE.

Table 3 shows that, 1) consistently across finer and finer specifications, Italian firms led by an over-65 CEOs are 4 percent less likely to mention access to finance as a constraint to firm growth, while for all other countries this figure is stable at around 1.5 percent. 2) At the same time, Italian firms led by an over-65 CEOs are 4 percent more likely to claim that lacking management is a constraint to growth, with this figure always significant at least at the 10 percent, and with significance increasing with finer specification; for all other countries this figure is stable at around 1.5 percent, and insignificant but for one specification (column 3). This suggest that, in the Italian case, some of the old-CEOs may be in place at cost, a cost that is justified by better access to funding for the firm they lead. Clearly, this is a qualitative answer, and the degree of detail is scarce. I thus work to find out whether the access to finance, and particularly to credit, peculiarity in Italy stands to finer test.

For a subset of the EFIGE dataset, Bruegel provides information on the age of the relationship between each firm f and its main bank, and on whether the firm was recently denied a credit application. I use this information to present the second piece of evidence, estimating

$$Y_{fc} = \alpha + \beta \text{ CEO Older than } 65_{fc} + \Gamma X_{fc} + \epsilon_{fc} \tag{3}$$

where Y_{fc} will be first a the age of the main credit relationship of firm f in years; then a dummy equal to 1 if firm f sees a credit application denied; while the other variables have been described before.

First, in Table 4 we can see that there is an overall strong and positive relationship between the old age of the CEO and the age of her firm's main credit relationship. As expected, though, upon the inclusion of controls for firm heterogeneity we can see that in Italy such effect is larger. In particular, it is about 25 percent larger (2.4 years more for over-65 CEOs against 3 years more for over-65 CEOs) if controlling for ownership structure, firm export activity and firm age, and about 60 percent larger (1.7 against 2.7) upon controlling (and restricting the estimation) for firms' balance sheet characteristics.

Second, in Table 5 we can see that only in Italy we can observe a negative relationship between the presence of an old CEO and the likelihood of the denial of a credit application. Even if the sample in this case is fairly small (700 observations for Italy, and 1,800 for the other countries), such correlation's significance increases with finer specifications, economic significance is strong (between 7 and 10 percent less likely to record an application denial). At the same time, the sign of the correlation for the other countries is reversed, settling on a noisy 5 percent greater likelihood of application denial for older CEOs' firms. To ensure that such observation is not explained by starkly different patterns in the use of funds, I use the same specification as in Equation 3 to show (Table 6) that there is no significant correlation between having an over-65 CEO and the likelihood of using external resources for specific projects.[15]

III Theory

In Section II I show that older managers in Italy have easier access to credit even after controlling for firm type and performance. It is thus reasonable to ask under which conditions this may imply a waste. Also, if a waste is implied, is there any space for policy intervention (i.e., can we talk of inefficiency in a meaningful way?), for example in the form of a subsidy to the new entrepreneurs/managers? In order to answer this question, I present a simple, static general equilibrium model, in which some agents face a higher cost for accessing funding. In this setting, I stack the cards in favor of the "intervention" scenario, and I show that, even if we assume that young people are all endowed with better human capital than old people, a case for subsidies requires further frictions to be added.

[15] I only use three of the five resource use dummies provided. I focus on dummies recording resource use to a) increase scale of production, b) fund working capital, c) optimize the financing mix. I do so as almost no firm in the dataset answers that it used external finances to fund acquisitions.

III.1 Environment

Consider a static economy where two mass-one continuums of agents - young and old, but these are just labels in my setting - coexist. All of them are risk neutral. In this economy, firms operate a technology that has decreasing returns in labor, and constant returns in managerial quality. Each firm is going to produce output y in quantity:

$$y = h^{\mathrm{M}} n^{\alpha} \tag{4}$$

where n is labor, h^{M} is managerial quality - with superscript $\mathrm{M} \in \{O, Y\}$ tracking whether firm's manager is old or young -, and α is the span of control parameter, assumed to be smaller or equal than 0.5.[16]

Output is produced at the end of the single period, but wages must be payed at the beginning of the period. The agents have no individual wealth before production is realized, and there is a risk neutral, deep pocketed investor, with an outside option paying 1 \$ for each \$ dollar invested. The economy is non-stochastic, and there is no way to default on the borrowing; though, the marginal cost of lending to old people is 0,[17] while the marginal cost of lending to the young people is γ. This is a reduced form shortcut to represent the relatively smaller cost of dealing with well-known counterparts, and matches the evidence I provided.[18] I will focus on the case in which the young agents are more skilled than the old agents, as it is the one relevant to think of a potential intervention.[19] Which is, I will assume that the young generation's ability is higher than old generation's ability: $h^O = 1,\ h^Y = x,$ s.t. $x > 1$.

There are thus two market clearing conditions for this economy, one for the good, and one for the labor market. Expressing all quantities in per manager terms, we have:

$$\begin{aligned} c^{\mathrm{M}} + R^{\mathrm{M}} n c^{\mathrm{W}} &= (n)^{\alpha} h^{\mathrm{M}} \\ n &= 1 \end{aligned} \tag{5}$$

where the W apex indicates the worker, and R is the gross interest rate required by the

[16] This assumption is necessary in such setting to have people willingly pursuing a manager career in equilibrium.

[17] On top and above the 1 \$ opportunity cost.

[18] For more empirical evidence of how old owners and managers come with established relationships, which grant considerable advantages in accessing credit, I refer to Engelberg, Gao, and Parsons (2012), Haselmann, Schoenherr, and Vig (2018), Karolyi (2018).

[19] Moreover, Daveri and Maliranta (2007) and Daveri and Parisi (2015) bring evidence that old managers in innovation intensive industries may arm performance.

bank to pay the stipends in advance, which will equal 1 if $\mathrm{M} = O$, and $1 + \gamma$ if $\mathrm{M} = Y$.

III.2 Manager problem

Then, each manager must solve the following constrained maximization:

$$\underset{n}{\text{Max}} \quad h^{\mathrm{M}} n^{\alpha} - w R^{\mathrm{M}} n \qquad \Rightarrow \; n = \left(\frac{\alpha h^{\mathrm{M}}}{R^{\mathrm{M}} w} \right)^{\frac{1}{1-\alpha}} \text{ (F.O.C.)} \tag{6}$$

where n is the amount of workers per manager the firm employs, and w is the equilibrium wage. The solution of the manager's problem allows us to write the profit as a function of the manager's quality, interest rate faced, and market wage:

$$\pi \left(h^{\mathrm{M}}, R^{\mathrm{M}}, w \right) = h^{\mathrm{M}} \left(\frac{\alpha h^{\mathrm{M}}}{R^{\mathrm{M}} w} \right)^{\frac{\alpha}{1-\alpha}} (1 - \alpha) \tag{7}$$

As, for simplicity, I assumed that all young have the same quality $x > 1$, while the old have the same quality 1, only two possible firms' allocations can emerge in equilibrium. In one case, the young agents get to lead the firms, the firms will have to pay the relationships setup costs with the bank and $R^{\mathrm{M}} = 1 + \gamma$. In this case, the wages and profits implied by the market clearing conditions in 5, and the first order condition in 6, are

$$w = \frac{\alpha x}{1 + \gamma}, \quad \pi \left(x, 1 + \gamma, w \right) = (1 - \alpha) x \tag{8}$$

while, in the other case, $R^{\mathrm{M}} = 1$, wages and profits are

$$w = \alpha, \quad \pi \left(1, w \right) = (1 - \alpha) \tag{9}$$

In order to understand which of these two outcomes are going to emerge in a decentralized equilibrium, I'm going to assume the existence of a market for control, which I analyze in the next subsections.

III.3 Equilibrium in the market for control

Similarly to Caselli and Gennaioli (2005), I am going to assume that firms are associated to licenses. I assume such licenses are initially with the old agents, and can be bought for a price q. To begin with, I will also assume that the higher cost of dealing with the

external investor for the young is the only friction. The contracts between old owner-managers and young aspiring owner-managers allow to transfer wealth between the two with no waste. In such a context, the value function of a young agent buying the firm from an old agent, and the one of an old agent selling, are

$$
\begin{aligned}
V_{\text{Young}}\left(\text{Buying}\right) &= x\left(\frac{\alpha x}{(1+\gamma)w}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - q \\
V_{\text{Old}}\left(\text{Selling}\right) &= w + q
\end{aligned} \tag{10}
$$

while, if the young does not buy and the old does not sell, individual value functions are

$$
\begin{aligned}
V_{\text{Old}}\left(\text{Keeping}\right) &= \left(\frac{\alpha}{w}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) \\
V_{\text{Young}}\left(\text{Not Buying}\right) &= w
\end{aligned} \tag{11}
$$

it follows that (details and algebra are shown in the Appendix).

Proposition 1 *There exists a unique competitive equilibrium which involves firms being managed by young agents if* $x \geq (1+\gamma)^{\alpha}$*, and by old agents if* $x < (1+\gamma)^{\alpha}$*.*

In order to find the allocation of control rights over firms implied by the equilibrium of this market, it is not necessary to know the exact price of the firms in equilibrium, only the willingness (or not) of the old agents to sell the licenses. This willingness is going to be pinned down by the value functions of old and young in the equilibrium with trade and the equilibrium without trade of licenses, and the deviation available to each young and old in each equilibrium.

Consider the equilibrium without trade, whose wage and profits are given in 9, and the deviations thereof.[20] The payoffs of such deviations can be easily obtained by inputing equilibrium wages in 7

$$
\begin{aligned}
V_{\text{Young}}\left(\text{Deviation} \mid \text{No-Trade}\right) &= x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - q \\
V_{\text{Old}}\left(\text{Deviation} \mid \text{No-Trade}\right) &= \alpha + q
\end{aligned} \tag{12}
$$

from these, I can derive an upper bound for the price of the firm under no trade, $\bar{q}$ - the most the young would pay for the firm in the no-trade equilibrium - and a lower bound $\underline{q}$ - the least the old would accept in the no-trade equilibrium.

[20] Deviations involve old agents still willing to sell the firm, and young agents still willing to buy.

$$
\begin{aligned}
\bar{q} &= \pi_{\text{Young}}\left(\text{Deviation} \mid \text{No-Trade}\right) - w = x\left(\frac{\alpha x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - \alpha \\
\underline{q} &= \pi_{\text{Old}}\left(\text{Keeping}\mid \text{No-Trade}\right) - w = (1-\alpha) - \alpha
\end{aligned} \tag{13}
$$

and the equilibrium without trade will exist as long as $\bar{q} < \underline{q}$, i.e.

$$
x < (1+\gamma)^{\alpha} \tag{14}
$$

Conversely, starting from the standpoint of an equilibrium with trade, we have that the wage and profits are given in 8. Deviation in such case would involve an old agent who is not willing to sell the firm, and a young agent not willing to buy. The payoffs of such deviations are

$$
\begin{aligned}
V_{\text{Young}}\left(\text{Deviation} \mid \text{Trade}\right) &= \frac{\alpha x}{1+\gamma} \\
V_{\text{Old}}\left(\text{Deviation} \mid \text{Trade}\right) &= \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha)
\end{aligned} \tag{15}
$$

in this case, existence requires a non-empty range of prices between the most the young would pay under the trade equilibrium, $\bar{q}$, and the least the old would accept in the trade equilibrium, $\underline{q}$, such that the firm can actually be traded on path. As

$$
\begin{aligned}
\bar{q} &= \pi_{\text{Young}}\left(\text{Buying}\mid \text{Trade}\right) - w = x(1-\alpha) - \frac{\alpha x}{1+\gamma} \\
\underline{q} &= \pi_{\text{Old}}\left(\text{Deviation} \mid \text{Trade}\right) - w = \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - \frac{\alpha x}{1+\gamma}
\end{aligned} \tag{16}
$$

non-emptiness of the price range, i.e $\bar{q} \geq \underline{q}$ is equivalent to the complement of 14

$$
x \geq (1+\gamma)^{\alpha} \tag{17}
$$

which proves that a unique threshold determines the unique equilibrium in the control market. In allocating control, young and old agents in this economy will trade-off the higher "quality" of the young, unconnected agents against the cost of setting up their relationships with the investor.

III.4 Efficiency of the allocation in the market for control

This framework presents complementarities in the action of trading the firm. If the equilibrium entails trade, trade increases the wages, and makes old agents more willing to sell the firm. I will show that there is a region in the parameter space in which promotion would increase the overall economy resources, but the increase in wage upon trade is not enough to make each single old agent willing to trade the firm. In these situations, I will speak about waste. Though, such waste does not imply an inefficiency, since, as long as the market for control is perfect, a planner could not do better while respecting the same constraints as the agents.

In the following, I will first show the formal result, and I will further comment on the economics of it before presenting the planner problem.

Proposition 2 *There exist $\bar{x}$: for all $x \in [\bar{x}, (1+\gamma)^\alpha]$ the allocation of control rights over firms to the young entails a higher total welfare than the equilibrium allocation without trade.*

Consider the resource constraints under the two different equilibria

$$\begin{aligned} &\text{(Resource Constraint, } RO\text{)} \; c^Y + c^O = 1 \text{ if } \; \mathrm{M} = O \\ &\text{(Resource Constraint, } RY\text{)} \; c^Y + c^O = x - \gamma \frac{\alpha x}{1+\gamma} \text{ if } \mathrm{M} = Y \end{aligned} \tag{18}$$

If the old are in control, managers' quality is lower ($h^O = 1$), but there is no transaction cost to access resources necessary to pay wages; if the young are in control, managers' quality is higher ($h^Y = x$), but the credit friction bites (and I evaluate it at the equilibrium wage: $\gamma \frac{\alpha x}{1+\gamma}$).

By comparing the total resources in RO and RY, it is easy to see that the condition under which total resources are higher under RY is different from $x \geq (1+\gamma)^\alpha$.

$$x \frac{1+\gamma(1-\alpha)}{1+\gamma} \geq 1 \;\Leftrightarrow\; x \geq \frac{1+\gamma}{1+\gamma(1-\alpha)} \tag{19}$$

in the following, I will refer to this threshold as the no-waste threshold.

As $\alpha \leq 0.5$ by assumption, the no-waste threshold is always below the $(1+\gamma)^\alpha$ threshold determining the existence of the equilibrium with trade.[21] This implies that, for some x differences in the managerial ability of old and young, allocating control to the young would increase available resources, but cannot be supported by free exchange.

[21] The same statement is true as long as $\alpha \leq 1$. Detailed proof in the Appendix.

Even though this shows that the economy can be far from the unconstrained optimum, it does not *per se* imply that there is meaningful space for policy. The waste stems from the fact that the equilibrium wage in the labor market depends on the allocation of control rights. If γ is small enough/x big enough to make the equilibrium wage with promotion higher than the equilibrium wage without promotion, higher wages implied by the equilibrium with promotion make this same equilibrium easier to sustain. Indeed, higher wages both decrease profits, and increase the opportunity cost of managing the firm. In this way, my model captures the idea that quicker growth, pushed also by quicker adoption of new skill/practices/technology, implies that there are more "good jobs" than the very top jobs. This makes the leadership turnaround, necessary to adopt the new skills, easier. As this acts through equilibrium prices, no single agent internalizes it in a competitive market for control, so we may have no promotion, even though promotion would actually increase the resources available to the economy.

On the other hand, as the market for control is without friction, agents pursue all the trades that are mutually gainful with respect to their available alternatives. The waste cannot be undone with ex-post efficient taxes and transfers, but only with ex-ante redistribution of the property rights.[22]

To see this formally, I state and prove the following proposition.

Proposition 3 *The equilibrium implied by the market for control is constrained efficient: A planner who cannot undo 1) the resource constraints of the economy, 2) the higher cost at which young owner-managers borrow for paying wages, and 3) the participation constraints of the agents, cannot propose a better allocation to these agents.*

In order to prove this, I envision a utilitarian planner[23] facing the following constraints

[22] A government which could instead commit to tax and throw away resources if the inferior equilibrium emerges could improve the situation. Though, such a government would need to commit to a threat that would not be credible as long as it cares about people welfare both before and after the equilibrium is realized.

[23] A planner who applies equal Pareto weights to the young and the old cohort.

$$\max_{c^Y,\, c^O,\, \mathrm{M}\in\{Y,O\}} c^Y + c^O$$

$$
\begin{aligned}
&\text{(Labor Resource Constraint) } n = 1\\
&\text{(Resource Constraint) } c^Y + c^O = n^\alpha \text{ if } \mathrm{M} = O\\
&\text{(Resource Constraint) } c^Y + c^O = n^\alpha x - \gamma \frac{\alpha x}{1+\gamma} n^{\alpha-1} n \text{ if } \mathrm{M} = Y\\
&\text{(Participation Constraint } Y) \; c^Y \geq V_Y(\text{Buying}|\ \mathrm{M} = O) = \alpha\\
&\text{(Participation Constraint } O) \; c^O \geq V_O(\text{Selling}|\ \mathrm{M} = O) = x n_{dev}^{\alpha}(O)(1-\alpha)\\
&\text{(Participation Constraint } Y) \; c^Y \geq V_Y(\text{Not Buying}|\ \mathrm{M} = Y) = \frac{\alpha x}{1+\gamma} n^{\alpha-1}\\
&\text{(Participation Constraint } O) \; c^O \geq V_O(\text{Keeping}|\ \mathrm{M} = Y) = n_{dev}^{\alpha}(Y)(1-\alpha)
\end{aligned}
\tag{20}
$$

in the following, I will refer to each constraint by the initial letterS, plus the letter labeling whether the control is allocated to old or young agents. Hence, the resource constraint if the old manage the firms will be RO, the participation constraint of the young if the old lead the firm will be POY, and so on and so forth.

Here the first two constraints exactly mirror the ones faced by the market economy. The labor and production markets must be cleared. In the third constraint, instead, the planner faces a $\gamma \frac{\alpha x}{1+\gamma} n^{\alpha-1}$ loss per each agent allocated to firms managed by young managers. I.e. a fraction of the marginal productivity of the workers is lost to the financial friction. This mirrors the loss of the economy when the young agents must interact with the bank. Finally, the fourth and fifth constraints imply that even though the planner can redistribute consumption and property rights, it cannot propose a plan entailing less consumption to each agent than they would achieve independently, given their original property rights. This, assuming that they would otherwise hire labor in the way they see fit, i.e. $n_{dev}(Y) = \left(\frac{1+\gamma}{x}\right)^{\frac{1}{1-\alpha}}$ for the deviation from the young mangers allocation, and $n_{dev}(O) = \left(\frac{x}{1+\gamma}\right)^{\frac{1}{1-\alpha}}$ viceversa.

Consider an allocation giving to both young and old the bare minimum so that POY and PYY are respected. Such allocation respects the resource constraint RY if and only if

$$
\begin{aligned}
&\frac{\alpha x}{1+\gamma} + \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) \leq x \frac{1+\gamma(1-\alpha)}{1+\gamma} \Leftrightarrow\\
&\left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) \leq x(1-\alpha) \Leftrightarrow x \geq (1+\gamma)^{\alpha}
\end{aligned}
\tag{21}
$$

as this condition is coincident with the equilibrium existence one in 17, the above shows there is no way to improve on the market allocation respecting the participation constraints. I present graphical illustration of attainable and unattainable unconstrained optimum through Pareto-frontier plot in Figure 7 and 8.

III.5 The enforcement friction in the market for control

I will then consider the case in which also the exchange of control rights between old and young agents is frictional. In this case, the friction in the market, affecting wages, creates a discrepancy in how the young and the old value the effect of one more dollar of wages when trading the firm, and opens the door to inefficiency and intervention.

I will assume that the transaction between young and old agents involves an iceberg cost $\phi \in [0,1]$, such that, if the young pays the price q, the old will only receive $q(1-\phi)$.[24] The value function of a young agent buying the firm from an old agent, and the one of an old agent selling will be modified as follows

$$
\begin{aligned}
V_{\text{Young}}\left(\text{Buying}\right) &= x\left(\frac{\alpha x}{(1+\gamma)w}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - q \\
V_{\text{Old}}\left(\text{Selling}\right) &= w + q(1-\phi)
\end{aligned}
\tag{22}
$$

while, if the young does not buy and the old does not sell, individual value functions are the same as in 11. In this case, the iceberg cost creates the possibility of multiple equilibria.

Proposition 4 *Equilibrium existence depends on the relative magnitudes of γ, ϕ, α and x, through the thresholds*

$$
\begin{aligned}
(A)\ x &\geq (1+\gamma)^{\alpha}\left[\frac{(1-\alpha)}{(1-\alpha)(1-\phi)+\frac{\phi\alpha}{1+\gamma}}\right]^{1-\alpha} \\
(B)\ x &< (1+\gamma)^{\alpha}\left[\frac{1-\alpha(1+\phi)}{(1-\alpha)(1-\phi)}\right]^{1-\alpha}
\end{aligned}
\tag{23}
$$

Whenever both (A) and (B) are violated, there exists no equilibrium in pure strategies; when (A) is verified, but (B) is not, then there exists a unique equilibrium in pure strategies, with young agents managing the firms; when (A) is not verified, but (B) is,

[24] There are multiple ways to justify this ϕ term. From steep notary fees in case an actual transaction is involved, to the risk of not being conferred the agreed upon stream of utility if we would interpret this transaction as the promotion of a young manager, conditional on the old manager serving on the firm board/being compensated with some perks for stepping down.

then there exists a unique equilibrium in pure strategies, with old agents managing the firms; finally, if both (A) *and* (B) *are verified, multiple equilibria in pure strategies exist.*

Again, to pin down the equilibrium allocation of control rights, we need to determine the upper and lower bound for the price at which control of the firm is traded, q.

Consider the equilibrium without trade; in such equilibrium the wage and profits are given in 9. Each agent is also allowed to deviate. For example, an old agent may still be willing to sell the firm, and a young agent to buy. The payoffs of such deviations are

$$\begin{aligned} V_{\text{Young}}\left(\text{Deviation} \mid \text{No-Trade}\right) &= x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - q \\ V_{\text{Old}}\left(\text{Deviation} \mid \text{No-Trade}\right) &= \alpha + q(1-\phi) \end{aligned} \tag{24}$$

from these I can derive an upper bound for the q price of deviation, $\bar{q}$, the most the young would pay for the firm, and a lower bound $\underline{q}$, the least the old would accept.

$$\begin{aligned} \bar{q} &= \pi_{\text{Young}}\left(\text{Deviation} \mid \text{No-Trade}\right) - w = x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - \alpha \\ \underline{q} &= \frac{1}{1-\phi}\left[\pi_{\text{Old}}\left(\text{Keeping} \mid \text{ No-Trade}\right) - w\right] = \frac{1}{1-\phi}\left[(1-\alpha) - \alpha\right] \end{aligned} \tag{25}$$

and the equilibrium without trade will exist as long as $\bar{q} < \underline{q}$, which yields condition (B).

Conversely, starting from the standpoint of an equilibrium with trade, we have that the wage and profits are given in 8. Deviation in such case would involve an old agent who is not willing to sell the firm, and a young agent not willing to buy. The payoffs of such deviations are

$$\begin{aligned} V_{\text{Young}}\left(\text{Deviation} \mid \text{Trade}\right) &= \frac{\alpha x}{1+\gamma} \\ V_{\text{Old}}\left(\text{Deviation} \mid \text{Trade}\right) &= \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) \end{aligned} \tag{26}$$

in this case, existence requires a non-empty range of prices between the most the young would pay, $\bar{q}$, and the least the old would accept, $\underline{q}$, such that the firm can actually be traded on path. As

$$
\begin{aligned}
&\bar{q} = \pi_{\text{Young}}\left(\text{Buying}|\ \text{Trade}\right) - w = x(1-\alpha) - \frac{\alpha x}{1+\gamma} \\
&\underline{q} = \frac{1}{1-\phi}\left[\pi_{\text{Old}}\left(\text{Deviation}\mid \text{Trade}\right) - w\right] = \\
&\frac{1}{1-\phi}\left[\left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) - \frac{\alpha x}{1+\gamma}\right]
\end{aligned} \tag{27}
$$

non-emptiness of the price range, i.e. $\bar{q} \geq \underline{q}$ will now yield condition (A). As it is possible (see Figure 9) that both (A) and (B) hold at the same time, we can see that allowing for the friction to affect also the control market, we open the door to a multiplicity of equilibria.

III.5.1 Efficiency and the friction in the market for control

As previously mentioned, an increase in wage entails two effects both for the old and for the young: decreases firm value, and rises the opportunity cost of managing the firm. Though, for the old agent, and only for her, there is a third effect now. All else equal, a higher wage implies that a smaller portion of her total income is subject to the transaction cost. Hence, a rise in wages decreases the value of retaining the firm for the old agent more than it decreases the value of acquiring it for the young one.

The result of this mismatch is that now multiple allocations in the market for control can be consistent with the participation constraints of the agents. This implies that welfare improving policies are possible even if the planner must respect such constraints, as she can play a role ruling out the Pareto-inferior equilibrium with a proper taxes and transfer scheme.

The first pre-requisite for this to be possible is that the no-waste threshold does not coincide with either (A) or (B), and that it can be located in the space between (A) and (B) when both (A) and (B) are respected. In this case there will be two equilibria, both possible, one superior and one inferior in terms of total resources and welfare.

Proposition 5 *The no-waste threshold does not coincide with* (A) *and* (B)*, and can be included within* (A) *and* (B)*.*

Consider the resource constraints under the two different equilibria. Now there is an additional loss component, the ϕ friction. This loss is the larger, the higher the price at which a firm trades; in order to prove my result for all the possible prices, it is then enough to consider the case of the higher possible q in the equilibrium with trade, i.e. $\bar{q} = (1-\alpha)x + \frac{\alpha x}{1+\gamma}$ in condition 27.

$$
\begin{aligned}
&\text{(Resource Constraint, } RO\text{) } c^Y + c^O = 1 \text{ if } \mathrm{M} = O \\
&\text{(Resource Constraint, } RY'\text{) } c^Y + c^O = x - \gamma\frac{\alpha x}{1+\gamma} - \phi\bar{q} \text{ if } \mathrm{M} = Y
\end{aligned} \tag{28}
$$

The no-waste threshold, resulting from the comparison of the unchanged RO with the modified RY', is thus changed

$$
(C)\ x \geq \frac{1+\gamma}{(1-\phi)(1-\alpha)(1+\gamma)+\alpha(1+\phi)} \tag{29}
$$

and it is again possible to prove that, for $\alpha < 0.5$, x can respect both (A) and (C). If it is also true that (B) is respected, then the possibility of an inefficient equilibrium without promotion is verified. I verify the possibility of this case within the model graphically, and display it in Figure 10.

In this case, it is then possible for the planner to improve on the market allocation.

Proposition 6 *The equilibrium implied by the frictional market for control can be inefficient: A planner who cannot undo 1) the resource constraints of the economy, 2) the higher cost at which young owner-managers borrow for paying wages, and 3) the participation constraints of the agents, can improve on the market allocation.*

$$
\max_{c^Y,\, c^O,\, \mathrm{M}\in\{Y,O\}} c^Y + c^O
$$

$$
\begin{aligned}
&(LRC)\ n = 1 \\
&(RO)\ c^Y + c^O = n^\alpha \text{ if } \mathrm{M} = O \\
&(RY)\ c^Y + c^O = n^\alpha x - (\gamma-\phi)\frac{\alpha x}{1+\gamma}n^{\alpha-1}n - \phi x n^\alpha(1-\alpha) \text{ if } \mathrm{M} = Y \\
&(PCYY)\ c^Y \geq V_Y(\text{Not Buying}|\ \mathrm{M} = Y) = \frac{\alpha x}{1+\gamma}n^{\alpha-1} \\
&(PCOY)\ c^O \geq V_O(\text{Keeping}|\ \mathrm{M} = Y) = n_{dev}^\alpha(Y)(1-\alpha) \\
&(PCYO)\ c^Y \geq V_Y(\text{Buying}|\ \mathrm{M} = O) = \alpha \\
&(PCOO)\ c^O \geq V_O(\text{Selling}|\ \mathrm{M} = O) = \alpha\phi n^{\alpha-1} + (1-\phi)x n_{dev}^\alpha(O)(1-\alpha)
\end{aligned} \tag{30}
$$

where I use the same labelling for the constraints as in 20.

With respect to the planner problem in 20, the most important difference regards the RY constraint. There, I add the loss component due to trading the firm ($\phi x n^\alpha(1-\alpha)$).

This new loss term interacts with the wage, as captured by the $(\gamma - \phi)$ term multiplying the loss due to interacting with the bank. In this setting, increasing the wage decreases the value of the firm, and thus the ϕ loss.[25] As this interaction happens through the price of labor, the planner can internalize it, and can propose a better allocation to an economy stuck in an inferior equilibrium. An example of this can be visualized in Figure 11, where both the equilibria with trade and no trade are possible, and the planner can pick the superior one.

IV Conclusion

In this paper I analyze aggregate and firm level data on the major European economies, France, Germany, Italy, Spain, and the United Kingdom. I show two stylized fact from Eurostat and World Bank's aggregate data. First, the age distribution of Italian managers has a fatter right tail than the one of its peers; such discrepancy is not matched by comparable discrepancy in the age profile of the population, in the entry and exit rate of firms, and in the age profile of the working population. Second, Italy is by far the worst performing country in terms of quality of enforcement; this both under the perspective of the expected time to solve a commercial dispute, and the cost of insolvency in terms of destroyed estate value. I cannot directly show that the second fact cause the first. Building on previous literature showing that weak enforcement makes credit more difficult to obtain, I use Bruegel's EFIGE manufacturer dataset to show that only in Italy a trade-off between the age of CEOs and access to financial resource appears to be at play, as we would expect if the weak enforcement caused an increase in the value of connections and reputation built over time. Motivated by this evidence, I analyze such trade-off through a static general equilibrium model of a market for the control of firms. I use the model to derive policy conclusions. I show that the difficulty to access financing is not enough to justify subsidies to new-comers even if we assume that they are endowed with better human capital. What is necessary to argue for such policy, is the assumption that the contracting friction directly affects the market for control.

[25] The shift in the participation constraint of the old under $M = O$ is not particularly relevant for my results.

Appendix

Further proofs and algebra

1. $\bar{q}$ (**No-Trade**) $< \underline{q}$ (**No-Trade**) **implies** $x < (1+\gamma)^{\alpha}$

By plugging expressions in 13, I obtain:

$$
\begin{aligned}
& x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha)-\alpha<(1-\alpha)-\alpha \\
& x^{\frac{1}{1-\alpha}}\left(\frac{1}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}<1 \\
& x<(1+\gamma)^{\alpha}
\end{aligned} \tag{31}
$$

2. $\bar{q}\,(\textbf{Trade}) \geq \underline{q}\,(\textbf{Trade})$ **implies** $x > (1+\gamma)^{\alpha}$

By plugging expressions in 16, I obtain:

$$
\begin{aligned}
& x(1-\alpha) - \frac{\alpha x}{1+\gamma} \geq \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}} (1-\alpha) - \frac{\alpha x}{1+\gamma} \\
& x^{\frac{1}{1-\alpha}} \left(\frac{1}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}} \geq 1 \\
& x \geq (1+\gamma)^{\alpha}
\end{aligned} \tag{32}
$$

3. **The no-waste threshold (inequality (19)) is weakly below the threshold for the equilibrium allocation of firms to the young (inequality (17)) for all (weakly) decreasing return to scale technologies**

First, we can see that both thresholds are increasing in γ. Second, we can notice that both thresholds are also increasing in α. Third, we can easily check that the thresholds coincide for $\alpha = 0$ and $\alpha = 1$

$$
\begin{aligned}
& (1+\gamma)^{\alpha} = 1 = \frac{1+\gamma}{1+\gamma(1-\alpha)} \text{ for } \alpha = 0 \\
& (1+\gamma)^{\alpha} = 1+\gamma = \frac{1+\gamma}{1+\gamma(1-\alpha)} \text{ for } \alpha = 1
\end{aligned} \tag{33}
$$

then, by monotonicity, if we prove that for a certain α threshold (19) is below threshold (17), we know that the same statement holds true for all γ and for all $\alpha \in (0,1)$. Indeed, pick $\alpha = 0.5$, we can see that

$$
(1+\gamma)^{0.5} > 0.5 \; \forall \; \gamma > 0 \tag{34}
$$

which concludes the argument.

4. $\bar{q}$ **(No-Trade)** $< \underline{q}$ **(No-Trade) when** $\phi > 0$ **implies** $x < (1+\gamma)^{\alpha}\left[\frac{1-\alpha(1+\phi)}{(1-\alpha)(1-\phi)}\right]^{1-\alpha}$

By plugging expressions in 25, I obtain:

$$
\begin{aligned}
& x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha)-\alpha \geq \frac{1}{1-\phi}[(1-\alpha)-\alpha] \\
& x^{\frac{1}{1-\alpha}}\left(\frac{1}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) \geq \frac{(1-\alpha)-\alpha\phi}{1-\phi} \\
& x^{\frac{1}{1-\alpha}}\left(\frac{1}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}} \geq \frac{1-\alpha(1+\phi)}{(1-\alpha)(1-\phi)} \\
& x \geq (1+\gamma)^{\alpha}\left[\frac{1-\alpha(1+\phi)}{(1-\alpha)(1-\phi)}\right]^{1-\alpha}
\end{aligned} \tag{35}
$$

5. $\bar{q}$ **(Trade)** $\geq \underline{q}$ **(Trade) implies** $x > (1+\gamma)^{\alpha}\left[\frac{(1-\alpha)}{(1-\alpha)(1-\phi)+\frac{\phi\alpha}{1+\gamma}}\right]^{1-\alpha}$

By plugging expressions in 27, I obtain:

$$
\begin{aligned}
& x\frac{(1-\alpha)(1+\gamma)-\alpha}{1+\gamma} \geq \frac{1}{1-\phi}\left[\left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha)-\frac{\alpha x}{1+\gamma}\right] \\
& x\frac{(1-\alpha)(1+\gamma)(1-\phi)-\alpha(1-\phi)+\alpha}{1+\gamma} \geq \left(\frac{1+\gamma}{x}\right)^{\frac{\alpha}{1-\alpha}}(1-\alpha) \\
& x\left(\frac{x}{1+\gamma}\right)^{\frac{\alpha}{1-\alpha}} \geq \frac{(1+\gamma)(1-\alpha)}{(1-\alpha)(1+\gamma)(1-\phi)+\alpha\phi} \\
& x > (1+\gamma)^{\alpha}\left[\frac{(1-\alpha)}{(1-\alpha)(1-\phi)+\frac{\phi\alpha}{1+\gamma}}\right]^{1-\alpha}
\end{aligned} \tag{36}
$$

Tables

Table 1: Descriptives: EFIGE dataset

	Mean	S.D.	p10	p50	p90	N
CEO Older than 65	0.123	0.328	0	0	1	13,771
Italy	0.307	0.461	0	0	1	13,771
France	0.143	0.350	0	0	1	13,771
United Kingdom	0.120	0.325	0	0	1	13,771
Spain	0.157	0.364	0	0	1	13,771
Old Firm	0.357	0.479	0	0	1	13,771
CEO related to Owners	0.668	0.471	0	1	1	13,771
Active Abroad	0.739	0.439	0	1	1	13,771
Owned by Foreigners	0.062	0.241	0	0	0	13,771
Employees	50.495	87.332	12	24	103	8,762
Total Assets	10.845	120.984	0.557	2.418	13.400	12,554
EBITDA	1.444	17.594	0.030	0.281	1.873	9,846
Liquidity	1.544	3.059	0.470	0.990	2.580	11,699
Age Main Bank Rel.	16.739	14.286	4	13	32	6,343
Denied Credit	0.228	0.420	0	0	1	2,585
Increase Scale	0.242	0.428	0	0	1	2,663
Out-Sector Participation	0.013	0.114	0	0	0	2,663
In-Sector Participation	0.006	0.074	0	0	0	2,663
Working Capital	0.535	0.499	0	1	1	2,663
Financing Mix	0.070	0.254	0	0	0	2,663
Managerial Constraint	0.116	0.320	0	0	1	11,456
Financial Constraint	0.325	0.468	0	0	1	11,456

This Table presents descriptive statistics for the EFIGE sample, with assets and EBITDA measured in millions of Euro.

Table 2: Correlation between CEO's old age and Italy

	Dependent variable:			
	CEO Older than 65			
Italy	0.126***	0.129***	0.135***	0.139***
	(13.21)	(12.45)	(13.00)	(7.98)
France	-0.047***	-0.048***	-0.029***	-0.016
	(-6.75)	(-6.27)	(-3.73)	(-1.03)
United Kingdom	0.031***	0.027**	0.048***	0.038*
	(3.32)	(2.57)	(4.59)	(1.95)
Spain	-0.023***	-0.024***	-0.007	-0.007
	(-3.05)	(-3.15)	(-0.84)	(-0.45)
Old Firm			0.061***	0.072***
			(8.47)	(6.95)
CEO related to Owners			0.041***	0.039***
			(6.30)	(4.22)
Active Abroad			0.023***	0.007
			(3.19)	(0.58)
Owned by Foreigners			-0.061***	-0.077***
			(-6.97)	(-7.18)
Employees				0.000
				(1.61)
Total Assets				-0.000**
				(-2.26)
EBITDA				0.001
				(1.04)
Liquidity				0.010***
				(3.21)
Germany (constant)	0.0910***	0.0909***	0.0183***	0.00970
	(16.20)	(15.22)	(2.01)	(0.51)
Industry FE		✓	✓	✓
Region FE		✓	✓	✓
Size Class FE		✓	✓	✓
R^2	0.040	0.044	0.059	0.072
Observations	13,771	13,771	13,771	7,996

This Table presents the results of the estimation of the following regression: CEO Older than $65_{fc} = \alpha + \beta$Country Dummies$_c + \Gamma X_{fc} + \epsilon_{fc}$, where CEO Older than 65_{fc} is a dummy taking value 1 if firm f, located in country c, is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Country Dummies$_{fc}$, dummies equal 1 if firm f is located in country $c \neq$ Germany. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class fixed effects; ϵ_{fc} is the heteroscedasticity robust standard error.

Table 3: Correlation between CEO's old age and constraints to firm growth

	Dependent variable:							
	CEO Older than 65							
	Else	Italy	Else	Italy	Else	Italy	Else	Italy
Managerial Constraint	-0.002	0.041*	0.019*	0.044*	0.015	0.046**	0.010	0.048**
	(-0.17)	(1.78)	(1.73)	(1.89)	(1.40)	(2.01)	(0.74)	(1.98)
Financial Constraint	-0.022***	-0.044***	-0.015**	-0.041**	-0.017**	-0.044***	-0.016	-0.049***
	(-3.26)	(-2.69)	(-2.20)	(-2.50)	(-2.43)	(-2.71)	(-1.56)	(-2.84)
Old Firm					0.032***	0.117***	0.012	0.115***
					(4.18)	(6.42)	(1.19)	(6.09)
CEO related to Owners					0.051***	0.027	0.077***	0.016
					(7.47)	(1.58)	(6.87)	(0.89)
Active Abroad					0.029***	0.017	0.003	0.007
					(3.66)	(0.90)	(0.22)	(0.34)
Owned by Foreigners					-0.040***	-0.210***	-0.043***	-0.233***
					(-4.12)	(-9.86)	(-3.68)	(-9.35)
Employees							0.00003	0.0003
							(0.50)	(1.46)
Total Assets							-0.00001**	-0.0002
							(-2.35)	(-0.52)
EBITDA							0.000007	-0.001
							(0.02)	(-0.20)
Liquidity							0.003	0.040***
							(0.91)	(3.14)
State-Sector FE			✓		✓		✓	
Industry FE				✓		✓		✓
Region FE			✓	✓	✓	✓	✓	✓
Size Class FE			✓	✓	✓	✓	✓	✓
R^2	0.001	0.003	0.016	0.018	0.031	0.044	0.054	0.055
Observations	8,436	3,020	8,435	3,020	8,435	3,020	3,223	2,685

This Table presents the results of the estimation of the following regression: CEO Older than $65_{fc} = \alpha + \beta$Managerial Constraint$_{fc} + \omega$Financial Constraint$_{fc} + \Gamma X_{fc} + \epsilon_{fc}$, where CEO Older than 65_{fc} is a dummy taking value 1 if firm f, located in country c, is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Managerial Constraint$_{fc}$ is a dummy equal to one if, in the answer to the survey, firm's f respondent claimed that lacking managerial resources constrain the growth of the firm; Financial Constraint$_{fc}$ is an equivalent dummy, if financial resources are mentioned as a constraint growth. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class, and country*industry fixed effects; ϵ_{fc} is the heteroscedasticity robust standard error.

Table 4: Correlation between CEO's age of main banking relationship

	Age Main Bank Rel.							
	Else	Italy	Else	Italy	Else	Italy	Else	Italy
CEO Older than 65	4.541***	4.487***	4.406***	4.311***	2.441**	2.989***	1.754*	2.683***
	(3.54)	(5.49)	(3.77)	(5.32)	(2.27)	(3.78)	(1.67)	(3.19)
Old Firm					12.043***	8.117***	8.839***	8.620***
					(19.72)	(11.12)	(13.05)	(11.18)
CEO related to Owners					2.373***	1.652***	1.718***	1.629***
					(4.76)	(2.90)	(3.18)	(2.65)
Active Abroad					-0.689	0.951	-0.997*	1.196*
					(-1.17)	(1.48)	(-1.70)	(1.69)
Owned by Foreigners					-4.015***	-1.705	-3.823***	-2.327
					(-3.98)	(-0.79)	(-3.02)	(-0.99)
Employees							-0.001	-0.013*
							(-0.17)	(-1.68)
Total Assets							-0.006	-0.013
							(-0.90)	(-1.05)
EBITDA							0.059	0.062
							(0.84)	(0.51)
Liquidity							0.089	0.745
							(0.75)	(1.04)
State-Sector FE			✓		✓		✓	
Industry FE				✓		✓		✓
Region FE			✓	✓	✓	✓	✓	✓
Size Class FE			✓	✓	✓	✓	✓	✓
R^2	0.006	0.021	0.101	0.045	0.235	0.141	0.175	0.154
Observations	4,483	1,860	4,482	1,860	4,482	1,860	2,680	1,657

This Table presents the results of the estimation of the following regression: Age Main Bank Rel.$_{fc} = \alpha + \beta$CEO Older than 65$_{fc} + \Gamma X_{fc} + \epsilon_{fc}$, where Age Main Bank Rel.$_{fc}$ is the age in year of the main credit relationship of firm f located in country c, CEO Older than 65$_{fc}$ is a dummy taking value 1 if the firm is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Managerial Constraint$_{fc}$ is a dummy equal to one if, in the answer to the survey, firm's f respondent claimed that lacking managerial resources constrain the growth of the firm; Financial Constraint$_{fc}$ is an equivalent dummy, if financial resources are mentioned as a constraint growth. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class, and country*industry fixed effects; ϵ_{fc} is the heteroscedasticity robust standard error.

Table 5: Correlation between CEO's and being denied a loan application

	Denied Credit							
	Else	Italy	Else	Italy	Else	Italy	Else	Italy
CEO Older than 65	0.006	-0.070*	0.058	-0.079*	0.056	-0.073*	0.053	-0.100**
	(0.16)	(-1.65)	(1.63)	(-1.84)	(1.53)	(-1.70)	(0.93)	(-2.24)
Old Firm					0.004	-0.015	0.022	-0.007
					(0.21)	(-0.37)	(0.72)	(-0.17)
CEO related to Owners					0.007	-0.079**	-0.009	-0.082*
					(0.31)	(-1.97)	(-0.30)	(-1.95)
Active Abroad					0.028	-0.023	0.035	-0.041
					(1.18)	(-0.52)	(0.87)	(-0.86)
Owned by Foreigners					0.035	0.097	0.034	0.037
					(0.82)	(0.63)	(0.70)	(0.23)
Employees							0.000	0.000
							(1.04)	(0.72)
Total Assets							-0.000	0.003
							(-0.70)	(1.38)
EBITDA							-0.014***	-0.019
							(-2.76)	(-1.52)
Liquidity							-0.020**	-0.146***
							(-2.38)	(-3.58)
State-Sector FE			✓		✓		✓	
Industry FE				✓		✓		✓
Region FE			✓	✓	✓	✓	✓	✓
Size Class FE			✓	✓	✓	✓	✓	✓
R^2	∼0.000	0.003	0.115	0.032	0.117	0.040	0.121	0.060
Observations	1,842	743	1,841	742	1,841	742	1,060	650

This Table presents the results of the estimation of the following regression: Denied Credit$_{fc} = \alpha + \beta$CEO Older than 65$_{fc} + \Gamma X_{fc} + \epsilon_{fc}$, where Denied$_{fc}$ is a dummy equal to 1 if firm f located in country c has been recently denied a credit application; CEO Older than 65$_{fc}$ is a dummy taking value 1 if the firm is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Managerial Constraint$_{fc}$ is a dummy equal to one if, in the answer to the survey, firm's f respondent claimed that lacking managerial resources constrain the growth of the firm; Financial Constraint$_{fc}$ is an equivalent dummy, if financial resources are mentioned as a constraint growth. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class, and country*industry fixed effects; ϵ_{fc} is the heteroscedasticity robust standard error.

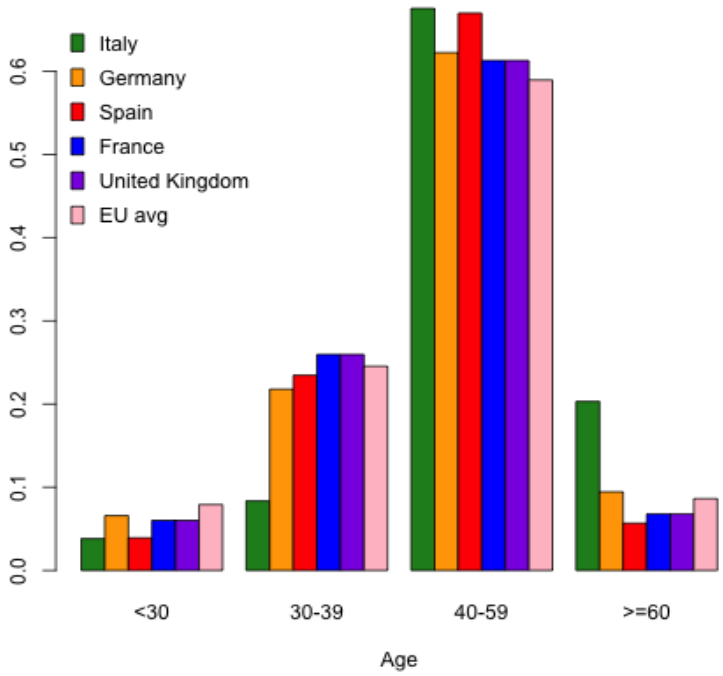
Table 6: Correlation between CEO's and use of external financing

	Increase Scale							
	Else	Italy	Else	Italy	Else	Italy	Else	Italy
CEO Older than 65	-0.072*	-0.011	-0.047	-0.024	-0.049	-0.029	-0.029	-0.031
	(-1.90)	(-0.30)	(-1.28)	(-0.62)	(-1.32)	(-0.73)	(-0.53)	(-0.74)
R^2	0.002	∼0.000	0.093	0.032	0.096	0.034	0.137	0.051
Observations	1,912	751	1,911	750	1,911	750	1,192	671
	Working Capital							
CEO Older than 65	0.063	0.026	0.105**	0.029	0.112**	0.036	0.100*	0.041
	(1.26)	(0.58)	(2.12)	(0.63)	(2.26)	(0.76)	(1.69)	(0.83)
R^2	0.001	∼ 0.000	0.147	0.046	0.155	0.050	0.171	0.074
Observations	1,912	751	1,911	750	1,911	750	1,192	671
	Financing Mix							
CEO Older than 65	-0.021	-0.004	-0.027	0.000	-0.029*	0.001	-0.019	0.010
	(-1.36)	(-0.15)	(-1.60)	(0.00)	(-1.68)	(0.05)	(-1.61)	(0.32)
R^2	0.001	∼ 0.000	0.031	0.035	0.034	0.037	0.040	0.048
Observations	1,912	751	1,911	750	1,911	750	1,192	671
State-Sector FE			✓		✓		✓	
Industry FE				✓		✓		✓
Region FE			✓	✓	✓	✓	✓	✓
Size Class FE			✓	✓	✓	✓	✓	✓
Survey Controls					✓	✓	✓	✓
Balance Sheet Controls					✓	✓	✓	✓

This Table presents the results of the estimation of the following regressions: Funding Use$_{fc} = \alpha + \beta$CEO Older than 65$_{fc} + \Gamma X_{fc} + \epsilon_{fc}$, where Funding Use$_{fc}$ is a dummy equal to 1 if firm f located in country c used external resources for specific purposes; these purposes can be increasing the scale of the business, financing working capital, or optimizing the funding mix; CEO Older than 65$_{fc}$ is a dummy taking value 1 if the firm is led by an over-65 CEO; α is a common intercept, coinciding with the excluded country dummy, Germany; Managerial Constraint$_{fc}$ is a dummy equal to one if, in the answer to the survey, firm's f respondent claimed that lacking managerial resources constrain the growth of the firm; Financial Constraint$_{fc}$ is an equivalent dummy, if financial resources are mentioned as a constraint growth. X_{fc} is a matrix of covariates. It includes, at its largest, a dummy equal to 1 if the firm birth is before 1976; a dummy equal to 1 if the CEO is related to the owners; a dummy equal to 1 if the firm is an active exporter; a dummy equal to 1 if the firm is owned by foreigners; the number of firm employees; total assets in millions of Euro; EBITDA; liquidity, calculated as fixed assets minus stocks, divided by current liabilities; region, industry, employee size-class, and country*industry fixed effects; ϵ_{fc} is the heteroscedasticity robust standard error.

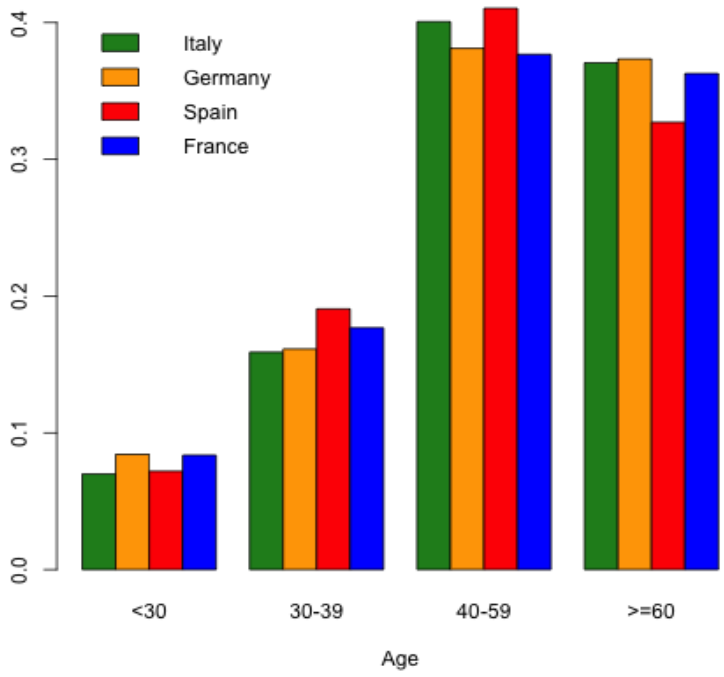
Figures

Figure 1: Managers age distribution, Eurostat



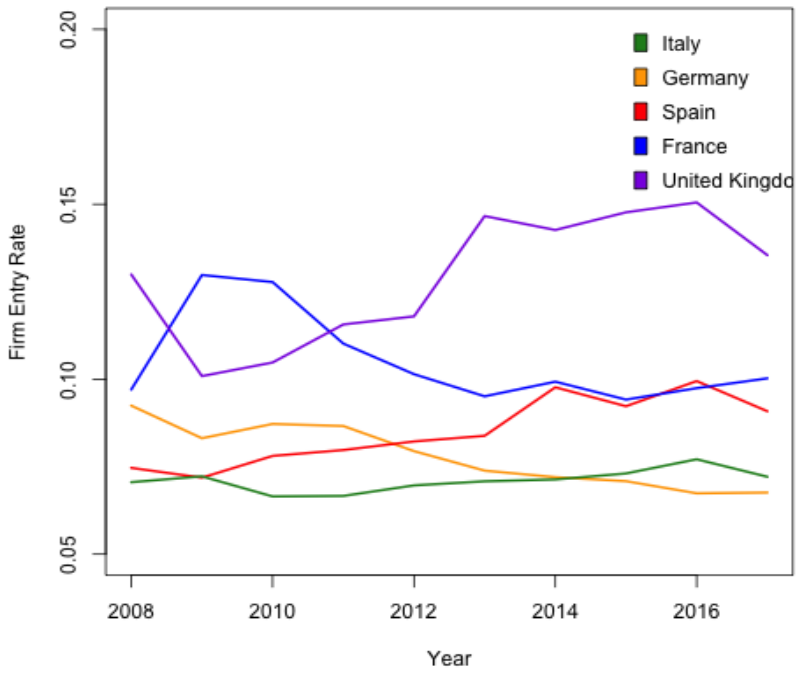
Note: The figure plots the age distribution of managers from the second quarter of 2017, using Eurostat country level data and European Union aggregate data. Figures report fraction of total managers population. Employees are classified as "managers" coherently with the International Standard Classification of Occupations from the International Labour Office.

Figure 2: Population age distribution



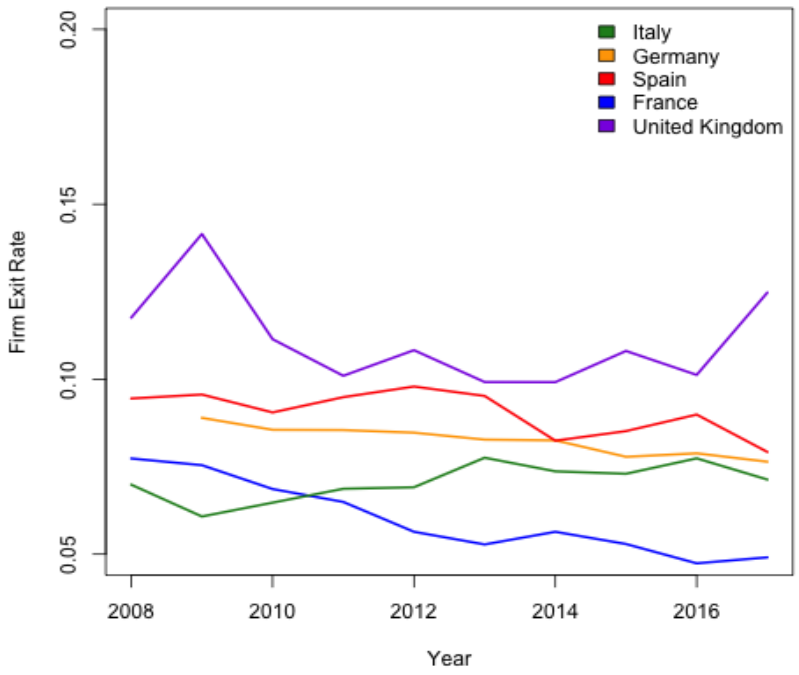
Note: The figure plots the age distribution of managers for the 2017, using Eurostat country level data. Figures report fraction of total population above 25 years old. The population is defined as all the people who reside legally in the country of interest.

Figure 3: Firm entry, Eurostat



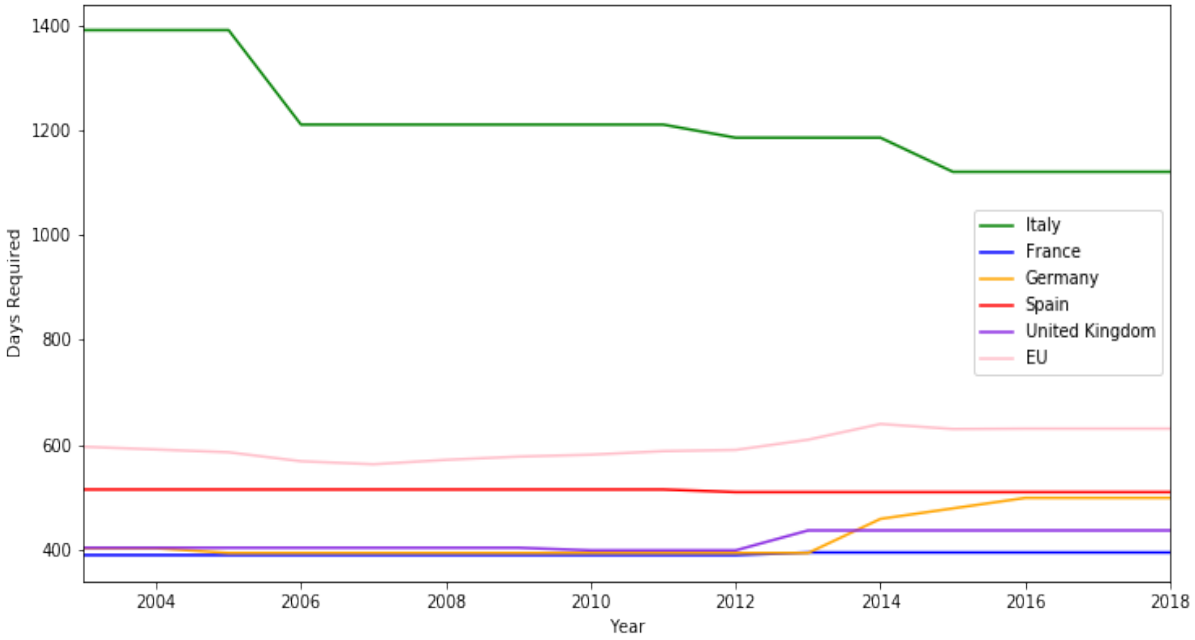
Note: The figure compares firm entry rate over time across major European countries. The rate is defined as number of firm births within the year over total firms at the beginning of the year.

Figure 4: Firm deaths, Eurostat



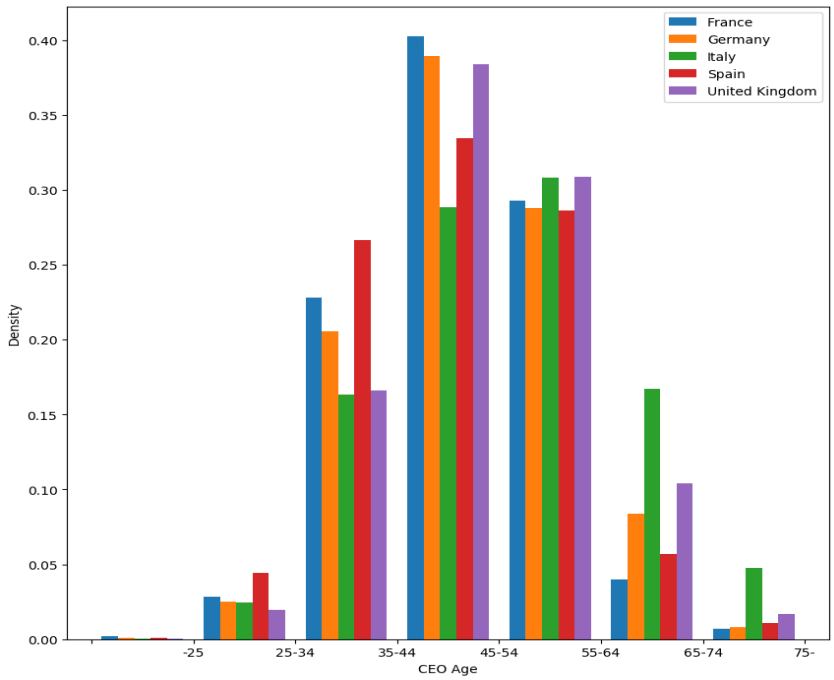
Note: The figure compares firm exit rate over time across major European countries. The rate is defined as number of firm deaths within the year over total firms at the beginning of the year.

Figure 5: Expected time to enforce contract



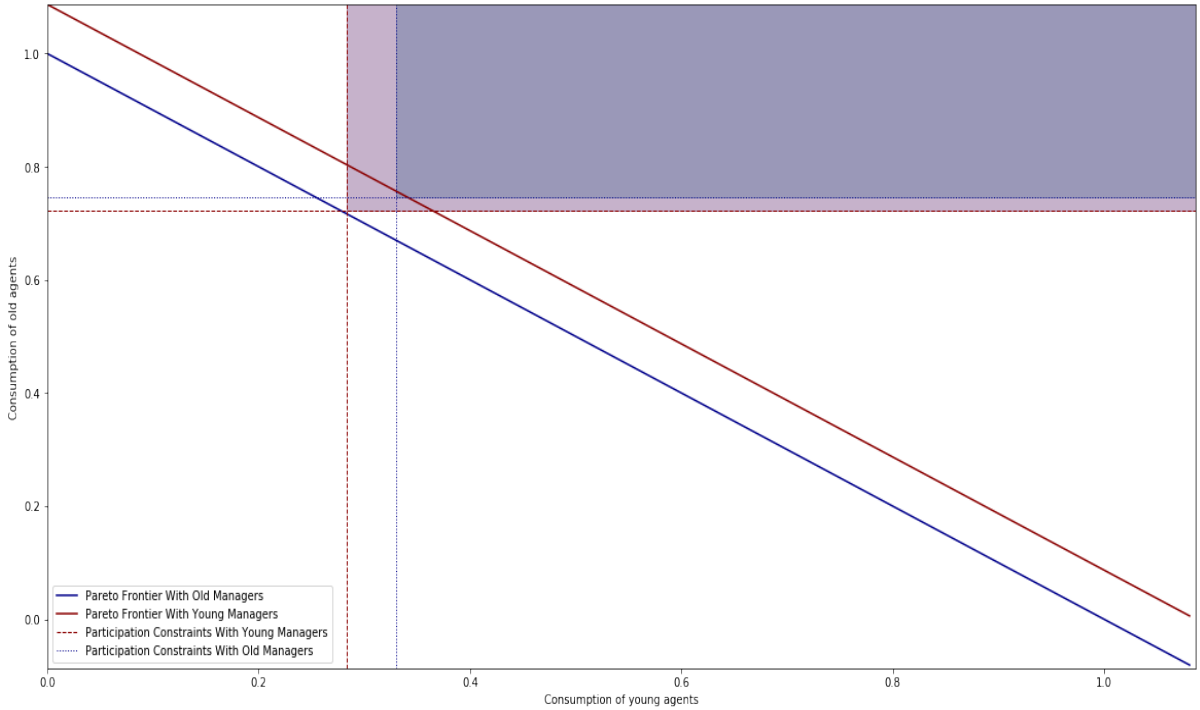
Note: The figure plots the expected time to enforce a contract in a court, comparing countries and the European Union average. Data are from the World Bank Doing Business Survey. Quoting the World Bank online description, the measure of the expected time is the "number of calendar days from the filing of the lawsuit in court until the final determination and, in appropriate cases, payment".

Figure 6: Managers age distribution, EFIGE



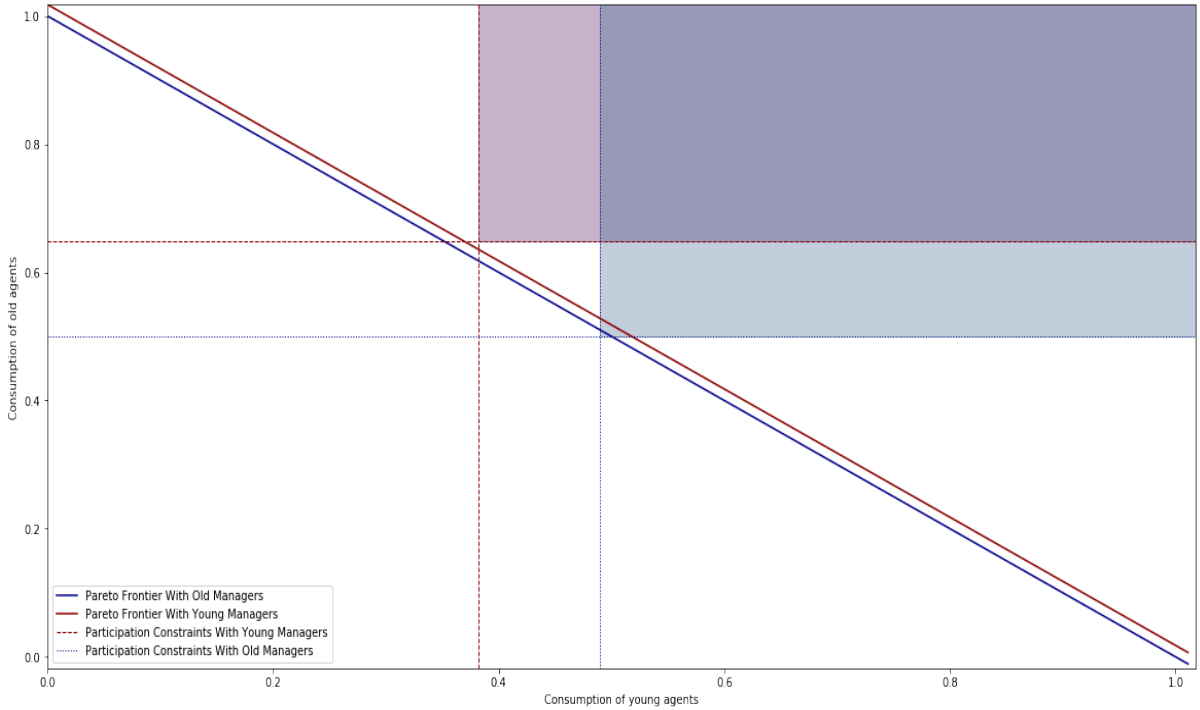
Note: The figure plots the age distribution of CEOs (including entrepreneurs) from EFIGE dataset.

Figure 7: Attainable first best



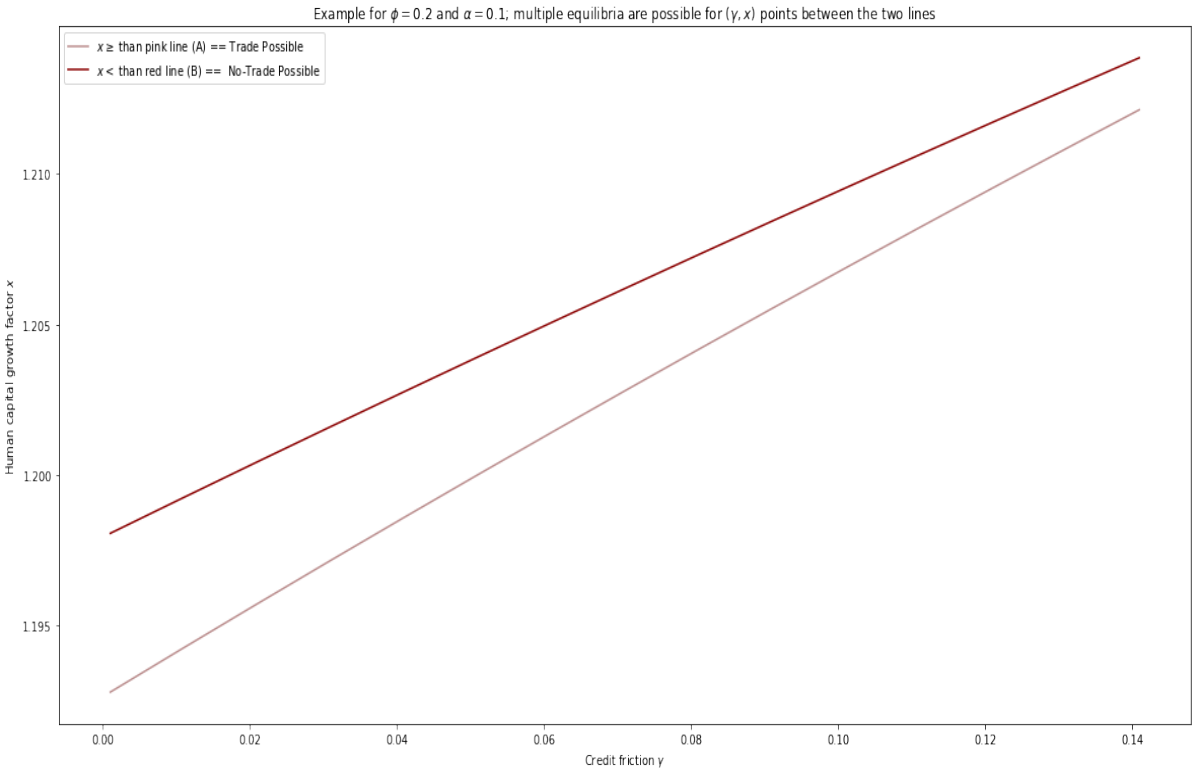
Note: The figure shows an example in which the first best is attainable to both the planner and the market in the case with only the financing friction. The red line plots the Pareto frontier if control rights are allocated to the young agents; the blue line plots the Pareto frontier if control rights are allocated to the old agents; the shaded red area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to young agents; the shaded blue area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to old agents.

Figure 8: Unattainable first best



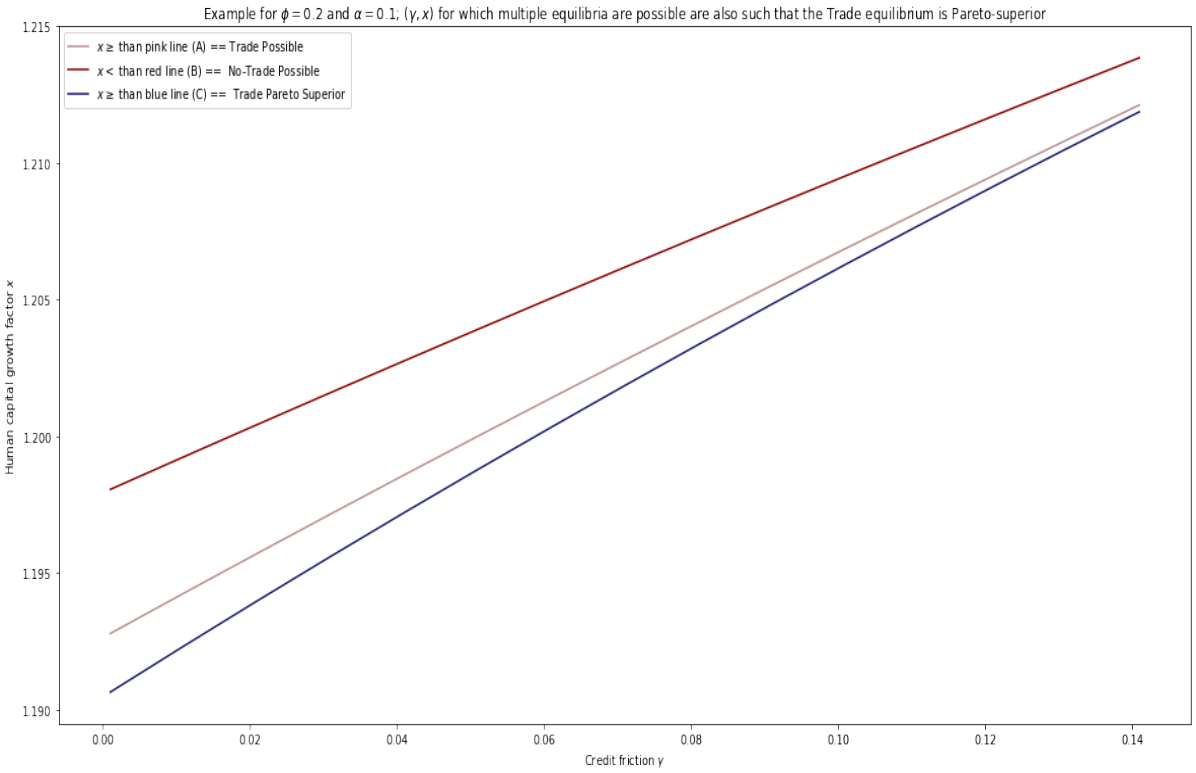
Note: The figure shows an example in which the first best is not attainable to both the planner and the market in the case with only the financing friction. The red line plots the Pareto frontier if control rights are allocated to the young agents; the blue line plots the Pareto frontier if control rights are allocated to the old agents; the shaded red area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to young agents; the shaded blue area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to old agents.

Figure 9: Possibility of multiple equilibria



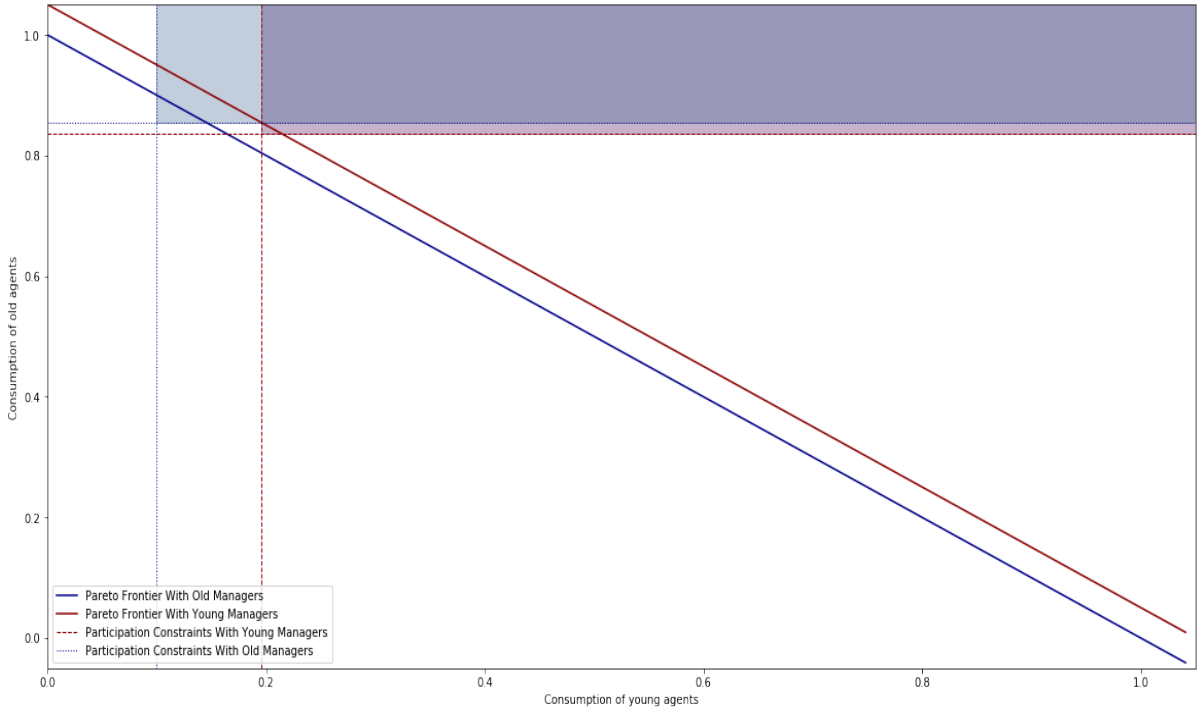
Note: The figure shows how, under some parametrization of the model, the market for control can allow for multiple equilibria. All combinations of the x and γ parameter above the pink line are such that the equilibrium with trade of the firm exists; all combinations of the x and γ parameter below the red line are such that the equilibrium without trade of the firm exists.

Figure 10: Multiple equilibria, example where trade is Pareto-dominant



Note: The figure shows an instance of how the existence of multiple equilibria implies Pareto-superiority of the equilibrium with trade. All combinations of the x and γ parameter above the pink line are such that the equilibrium with trade of the firm exists; all combinations of the x and γ parameter below the red line are such that the equilibrium without trade of the firm exists; all combinations of the x and γ parameter above the blue line are such that the equilibrium with trade of the firm is superior in terms of resources available than the equilibrium without trade of the firm.

Figure 11: Multiplicity and space for policy



Note: The figure shows an example in which the first best is attainable, may not be picked by the market, but can be achieved by the planner within the constraints of the economy. The red line plots the Pareto frontier if control rights are allocated to the young agents; the blue line plots the Pareto frontier if control rights are allocated to the old agents; the shaded red area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to young agents; the shaded blue area represents the allocations that are compatible with the agents' participation constraints if control rights are allocated to old agents.

References

Acemoglu, Daron, Simon Johnson, and James A. Robinson. 2005. "Institutions as a fundamental cause of long-run growth." *Handbook of Economic Growth* 1:385–472.

Acs, Zoltan, Thomas Åstebro, David Audretsch, and David T Robinson. 2016. "Public policy to promote entrepreneurship: a call to arms." *Small Business Economics* 47 (1):35–51.

Aiyar, Shekhar and Christian H. Ebeke. 2017. *The impact of workforce aging on european productivity*. International Monetary Fund.

Altomonte, Carlo and Tommaso Aquilante. 2012. "The EU-EFIGE / Bruegel-Unicredit dataset." Working Paper 2012/13, Bruegel. URL https://www.econstor.eu/bitstream/10419/78019/1/728570009.pdf.

Åstebro, Thomas. 2017. "The private financial gains to entrepreneurship: Is it a good use of public money to encourage individuals to become entrepreneurs?" *Small Business Economics* 48 (2):323–329.

Bandiera, Oriana, Luigi Guiso, Prat andrea, and Raffaella Sadun. 2008. "Italian managers: Fidelity or performance." Working paper, Rodolfo De Benedetti Foundation. URL http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.211.4826&rep=rep1&type=pdf.

Besley, Timothy. 2015. "Law, regulation and the business climate: The nature and influence of the World Bank Doing Business project." *Journal of Economic Perspectives* 29 (3):99–120.

Bloom, Nicholas and John Van Reenen. 2010. "Why do management practices differ across firms and countries?" *Journal of Economic Perspectives* 24 (1):203–24.

Boeri, Tito, Antonio Merlo, and Andrea Prat. 2010. *The ruling class: management and politics in modern Italy*. OUP Oxford.

Burkart, Mike, Fausto Panunzi, and Andrei Shleifer. 2003. "Family firms." *The Journal of Finance* 58 (5):2167–2201.

Caselli, Francesco and Nicola Gennaioli. 2005. "Credit constraints, competition and meritocracy." *Journal of the European Economic Association* 3 (2-3):679–689.

———. 2013. "Dynastic management." *Economic Inquiry* 51 (1):971–996.

Daveri, Francesco and Mika Maliranta. 2007. "Age, seniority and labour costs: lessons from the Finnish IT revolution." *Economic Policy* 22 (49):118–175.

Daveri, Francesco and Maria Laura Parisi. 2015. "Experience, innovation and productivity: empirical evidence from Italy's slowdown." *ILR Review* 68 (4):889–915.

Djankov, Simeon, Rafael La Porta, Florencio Lopez-de Silanes, and Shleifer andrei. 2003. "Courts." *The Quarterly Journal of Economics* 118 (2):453–517.

Drozd, Lukasz A. and Ricardo Serrano-Padial. 2018. "Financial contracting with enforcement externalities." *Journal of Economic Theory* 178:153–189.

Engelberg, Joseph, Pengjie Gao, and Christopher A. Parsons. 2012. "Friends with money." *Journal of Financial Economics* 103 (1):169–188.

Fotopoulos, Georgios and David J. Storey. 2019. "Public policies to enhance regional entrepreneurship: another programme failing to deliver?" *Small Business Economics* 53 (1):189–209.

Giacomelli, Silvia and Carlo Menon. 2016. "Does weak contract enforcement affect firm size? Evidence from the neighbour's court." *Journal of Economic Geography* 17 (6):1251–1282.

Greenwald, Bruce C. and Joseph E. Stiglitz. 1986. "Externalities in economies with imperfect information and incomplete markets." *The Quarterly Journal of Economics* 101 (2):229–264.

Haselmann, Rainer, David Schoenherr, and Vikrant Vig. 2018. "Rent Seeking in Elite Networks." *Journal of Political Economy* 126 (4):1638–1690.

ILO. 2012. *International Standard Classification of Occupations 2008 (ISCO-08): Structure, group definitions and correspondence tables*. International Labour Office.

Jappelli, Tullio, Marco Pagano, and Magda Bianco. 2005. "Courts and banks: Effects of judicial enforcement on credit markets." *Journal of Money, Credit and Banking* 37 (2):223–244.

Karolyi, Stephen Adam. 2018. "Personal lending relationships." *The Journal of Finance* 73 (1):5–49.

Kodama, Naomi and Huiyu Li. 2018. "Manager Characteristics and Firm Performance." Tech. rep., Research Institute of Economy, Trade and Industry (RIETI).

La Porta, Rafael, Florencio Lopez-de Silanes, and Shleifer andrei. 1999. "Corporate ownership around the world." *The Journal of Finance* 54 (2):471–517.

La Porta, Rafael, Florencio Lopez-de Silanes, Shleifer andrei, and Robert Vishny. 2000. "Investor protection and corporate governance." *Journal of Financial Economics* 58 (1-2):3–27.

Lippi, Francesco and Fabiano Schivardi. 2014. "Corporate control and executive selection." *Quantitative Economics* 5 (2):417–456.

Lucas Jr, Robert E. 1978. "On the size distribution of business firms." *The Bell Journal of Economics* :508–523.

Macchiavello, Rocco and Ameet Morjaria. 2015. "The value of relationships: evidence from a supply shock to Kenyan rose exports." *American Economic Review* 105 (9):2911–45.

MacLeod, W. Bentley. 2007. "Reputations, relationships and contract enforcement." *Journal of Economic Literature* 45 (3):595–628.

Moser, Petra. 2013. "Patents and innovation: Evidence from economic history." *Journal of Economic Perspectives* 27 (1):23–44.

Pellegrino, Bruno and Luigi Zingales. 2017. "Diagnosing the Italian disease." Tech. rep., National Bureau of Economic Research.

Piguillem, Facundo and Loris Rubini. 2019. "Barriers to firm growth in open economies." *The BE Journal of Macroeconomics* 19 (1).

Schiantarelli, Fabio, Massimiliano Stacchini, and Philip E. Strahan. 2020. "Bank quality, judicial efficiency and loan repayment delays in Italy." *The Journal of Finance* .

Schivardi, Fabiano and Tom Schmitz. 2018. "The IT revolution and southern Europe's two lost decades." *Journal of the European Economic Association* .

Steinberg, Joseph B. 2019. "Brexit and the macroeconomic impact of trade policy uncertainty." *Journal of International Economics* 117:175–195.