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This is the peer reviewed version of the following article:

Original:

Landini, F., Pagano, U. (2020). Stakeholders' conflicts and corporate assets: an institutional meta-complementarities approach. *SOCIO-ECONOMIC REVIEW*, 18(1), 53-80 [10.1093/ser/mwy017].

Availability:

This version is available <http://hdl.handle.net/11365/1061812> since 2018-11-02T15:12:11Z

Published:

DOI:10.1093/ser/mwy017

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Fabio Landini, Ugo Pagano

**Stakeholders conflicts and corporate assets:
an institutional meta-complementarities approach**

Abstract

In this paper we argue that the relationship between shareholder conflicts and corporate assets can generate multiple equilibrium configurations that can be helpful to understand how corporate governance systems may change under different historical models of capitalism. These relationships can be modeled as "meta-complementarities" existing among two different sets of institutional complementarity. The first institutional complementarity arises in realm of the conflicts among different stakeholders and generates multiple equilibria that define different systems of rights on corporate assets. The second institutional complementarity arises between corporate rights and assets. Dispersed shareholders and non-unionized workers are complementary organizational forms and generate a form of corporate governance interacting with complementary corporate assets. A similar set of institutional meta-complementarities characterizes the relation between concentrated ownership, unionized workers and corporate assets.

Keywords: institutional complementarities, varieties of capitalism, corporate governance, USA, Europe.

JEL Classifications: P51, P48, B52

1. Introduction

In “Strong Managers, Weak Owners” Roe (1994: 4) observed:

“Although the defects of separation are today in the spotlight – without their own money on the line managers can pursue their own agendas, sometimes to the detriment of the enterprise – separation of ownership and control was historically often functional (and still is), because it allows skilled managers without capital to run the firm and separates unskilled descendants from control of the firm they could not run well. Sometimes successful founders became poor managers, because their accumulated wealth allowed them to slack off but still live well as historically was a problem in Britain.”

On this view, managerial hierarchies do not simply imply the usual problem of making the interests of the managers consistent with those of the shareholders. They also imply a broader and, somehow, opposite problem: that of the consistency between the “family allocation of control” and the internal meritocracy of the firm. In order to work well, managerial hierarchies must be organized according to fair rules of career advancement that may easily clash with the allocation of jobs on the basis of family connections. In spite of the well-known agency problems, the separation between ownership and control had some positive effects because it implied a prevalence of competence allocation rules over family connection rules. While small firms could easily work on the basis of a family allocation of control, this was much harder for large firms. For this reason, in spite of all its agency problems, managerial capitalism was bound to prevail and prosper in some countries.

The predominance of dynastic over competence criteria in the allocation of jobs has strong political roots. The way in which social conflict is settled has a crucial impact on how firms are owned and how authority is divided. According to Roe (1994; 2003), in particular, the separation of ownership and control is strictly related to the degree of ‘social democracy’, *i.e.*, the strength of pressure by stakeholders, especially labour. Where social democracy is strong, labour is powerful and can pressure managers to take decisions that forgo profit-maximization: for example to avoid downsizing, to be cautious in taking risks that may affect the workplace. These are precisely the kinds of colluding activities that increase managerial agency costs and undermine the functioning of modern corporations. By contrast, a weak social democracy is conducive to the emergence of the meritocratic institutions necessary for the working of managerial hierarchies. The lack of class division removes the need to use dynastic rules as means to defend class positions, and it makes the delegation of control to salaried managers less risky for owners.

As suggested by Belloc and Pagano (2009, 2013), however, whilst the presence of social-democratic job protection may prevent the radical diversification of asset ownership and the transfer

of power from owners to managers, also the reverse causality may hold: social democratic job protection becomes stronger when the lack of restrictions on block-holders makes it easier to gain private benefit from ownership. When there is no separation between ownership and control, workers are more likely to seek protection against interference by owners and their social circles, including their relatives and friends, who may otherwise monopolize the best jobs in the company. Conversely, when the interests of capitalists are dispersed, workers have little incentive to face the collective action costs associated with the strengthening of their social protection. Thus, whilst social democracy may prevent the separation between ownership and control, the existence of powerful block-holders may favour some reaction in terms of workers' protection. This relationship entails multiple co-evolution paths between ownership concentration (business) and workers' organization (politics): a certain degree of centralization of one side's interests may easily induce a corresponding concentration of the other side's interests.

However, what happens in the political sphere does not have only effects on the rights that the stakeholders have on the corporations. Corporate rights and technical assets co-evolve as well. The institutional trajectory leading to a particular variety of capitalism is stabilized by this co-evolution pattern. Typically, when ownership is dispersed and unions are weak managerial hierarchies can be characterized by fair internal rules of promotion, which are not broken by the interference of strong block-holders or by union-based and political lobbies. In this situation managers can make investments that are specific to the managerial hierarchy and that can be monitored and evaluated by other managers. Since the specific and hard to monitor corporate assets can become very valuable, any change in corporate governance that threatens the rules and safeguards of managerial careers, such as concentrated ownership, is likely to be very costly. In other words, once the corporate assets corresponding to a dispersed equilibrium have been developed it is harder to move to a concentrated equilibrium where the managers enjoy lower safeguards. Concentrated block-holders should pay a high price to induce the managers to continue to provide the same valuable corporate assets because the risk of interference and the lack of identification with the organization would involve very high agency costs. It is true that now the block-holders could be more easily induced to make specific investments, again difficult to monitor, in the organization. However, the human capital developed by them is likely to be low in a firm under dispersed ownership and unlikely to compensate for the extra-money to be paid for the managers. In other words, under dispersed ownership (and disorganized labour) there will be a tendency to employ corporate resources that make that arrangement self-sustaining.

In a similar way, if we are in a concentrated equilibrium with owners (and workers) having strong rights, we are likely to have an intensive employment of their difficult to monitor and specific skills

but little investment by professional managers that fear the interference of the family dynasty in their careers. Typically, these firms do not employ professional top managers selected in their family-polluted hierarchies. They must often employ, at a very high cost, managers that could signal their capabilities in dispersed-ownership firms where properly developed managerial hierarchies are not subject to the interference of block-holders.

Thus, systems of corporate governance present distinct but interdependent sets of institutional complementarities. At the political level stakeholder interactions generate different “antagonistic complementarities” that involve different forms of corporate governance. In turn, at the organizational level, these different forms of corporate governance are complementary to different corporate assets. These latter, which we call “synergic complementarities”, tend to stabilize the arrangements stemming from stakeholders antagonistic complementarities. The corporate assets generated in this process may determine the superiority of one system of corporate governance and sometimes even its unfeasibility (in the sense that even the assets employed under a certain system of corporate governance involve that the alternative system is more profitable). However, multiple organizational equilibria are possible and different systems of corporate governance may enjoy an institutional comparative advantage in different sectors.

In this paper we develop a model of antagonistic and synergetic complementarities in corporate governance systems. Based on a two-level game, we first discuss institutional complementarities at the political and organizational level and then study the interdependences between the two levels. The model helps us to define the conditions under which multiple equilibrium models of corporate governance exist and to specify their characteristics. Although we focus on the interactions between two types of complementarities only, our approach is a first step towards a model encompassing the numerous complementarities pointed out by Aguilera and Jackson (2003, 2010) and Aguilera et al. (2008). In line with Amable et al. (2005) and O’Sullivan (2000) (among others) our main aim is to make sense of the wide variety and persistence of different corporate governance models. Differently from them, however, we consider the combination of multiple complementarities at once. Moreover, rather than focusing on the characteristics of each corporate governance model in contemporary capitalism, our main focus is on the institutional trajectories leading to differentiation across models starting from late nineteenth century capitalism. On the basis of the model we derive two main results: first, in presence of both antagonistic and synergetic complementarities the stability of corporate governance systems is enhanced and transitions across different institutional arrangements becomes even more difficult, although not impossible; second, the combination of synergetic and antagonistic complementarities may lead to multiple corporate governance equilibria whose relative efficiency is not always granted. The latter, in particular, depends on specific factors such as corporate

profits and managerial rents. In the last part of the paper these results are used to analyze the historical trajectories leading to variation of corporate governance models in US and Europe.

Our paper relates to two main streams of literature. The first one is the literature on institutional complementarities, *i.e.*, synchronic interdependence across distinct institutional domains (Aoki, 2001; Amable, 2000, 2003; Boyer, 2005; Amable et al., 2005; Höpner, 2005; Campbell, 2011). This concept has been employed in several contexts to study the evolution of institutional forms, including modes of production (Pagano and Rowthorn 1994; Pagano and Rossi, 2004; Pagano, 2011; Landini, 2012, 2013) and varieties of capitalism (Hall and Soskice, 2001). It has also been applied by Aoki and Jackson (2008) to the analysis of the relationship between the rights (underlying each system of corporate governance) and organizational architecture (involving different relations of unilateral and reciprocal dependency among different factors). First we discuss the existence of different types of institutional complementarities, both antagonistic and synergetic, and their interactions that can be seen as institutional meta-complementarities. In other word we try to look separately at the complementarities arising within the rights of each system of corporate governance (antagonistic complementarities) and within each organizational architecture (synergic complementarities) and we try to join together in one system of systemic institutional meta-complementarities. Second, we investigate how these institutional meta-complementarities can explain the historical evolution of different models of capitalism which involves complex interactions among these different domains.

The second stream of literature we relate to is the one on corporate governance systems. For a long time, at least until the recent economic crisis, several authors advocated the merit of the Anglo-American system, which is characterized by a relatively weak role of block-holding. Independently of its presumed origin, whether legal (La Porta et al., 1998, 1999), electoral (Pagano and Volpin, 2005) or political (Roe, 2003), this literature encouraged the change of what was once an “American exception” into the general rule to be followed by all countries. Recently, however, the economic crisis and corporate failures have called the presumed validity of the Anglo-American model into question, while at the same time highlighting its drawbacks. Starting from this evidence, some authors (e.g., Millhaupt and Pistor, 2008; Belloc and Pagano, 2009, 2013) have suggested that a better understanding of the diversity of corporate governance models could be gained by focusing on the interdependences among distinct institutional domains. With respect to this approach, the contribution of our paper is to provide a theoretical micro-foundation of such interdependences, which includes both antagonistic and synergetic complementarities. This micro-foundation provides another route to understand the complex relations between politics, law and the economy, characterizing the different systems, which involve that the same policies can have sometimes

beneficial and sometimes deleterious consequences in different contexts (Acemoglu and Robinson 2013, Milhaut and Pistor 2008).

The rest of the paper is organized as follows. Section 2 draws on the notion of antagonistic complementarities to model political struggle among social groups. Section 3 exploits the antagonistic equilibria identified in Section 2 to model the synergetic adaptation of corporate rights and assets. Section 4 uses the comparative history of the American and European economies to illustrate how models of capitalism can diverge. Section 5, finally, concludes.

2. Stakeholders antagonistic complementarities.

In advanced capitalist countries, there exists a positive cross-country correlation between the degree of ownership concentration and social democracy (Belloc and Pagano, 2009). Part of the literature explains such correlation as a response of ownership concentration to social democracy (e.g., Roe, 1994, 2003). In principle, however, also the reverse causality may hold and one can see social democracy, unions or other ways of expressing a concentrated voice of the workers as a response to a high degree of ownership concentration and to a strong political power of the capitalist owners (Jackson 2001). In this section we follow the intuition of Belloc and Pagano (2009, 2013) and model the relationship between ownership concentration and social democracy considering both directions of causation at the same time. In doing so, we provide a micro-foundation for what we call “antagonistic complementarities”, namely institutional complementarities arising at the political level, where the conflict between owners and workers is managed. The results of this section can be useful in two ways: first, they can help us define the conditions under which antagonistic complementarities and thus multiple business-politics varieties effectively exist; second, they can be used as inputs to model interdependences with the second level of institutional complementarities that we will consider, namely the one relating corporate rights and assets (see Section 3).

A relatively simple way of modelling conflictual complementarities is the following. Consider an economy populated by three (representative) agents: owners (o), managers (m) and workers (w). Agents o , m and w contribute to production by interacting within an organization that we call a ‘firm’. A firm is a private ordering with a well-defined structure of authority relations such that o exercises authority over m , who in turn exercises authority over w (see Pagano, 2000). In this economy o and w select the degrees of interest concentration that characterize their class organizations. Agent o ’s organizations pertain to the domain of property (O), while w ’s organizations pertain to the domain of polity (W). Agent m has no formal class organization but is affected by the choices made by o and w .

In domain O two alternatives are available: high (O_H) and low (O_L) concentration of corporate rights, *i.e.*, $O = \{O_H, O_L\}$. O_H is associated with the presence of a single (or a few) powerful owner so that family ties and dynasties are important in determining career advancement within the organization. O_L , on the contrary, combines a dispersed ownership structure with heavy reliance on public markets as job-allocation devices. These two alternatives reflect the models of corporate governance usually associated with the family business and the managerial enterprise.

In domain W , similarly, agent w can choose between two options: high (W_H) and low (W_L) concentration of its interests, *i.e.*, $W = \{W_H, W_L\}$. W_H reflects a situation *a situation in which some institutions allow a “concentrated voice” of the interests of the workers (these institutions may be unions, participation to business decisions, a strong social-democratic party or they may take other historical forms)*. W_L represents instead the opposite situation in which these institutions are weak and workers find it difficult to express their voice in the decisions of the corporations.

As stated above, in this context we assume m to be not directly involved in the class struggle between o and w^1 . However, m is not indifferent to the outcome of that struggle. In fact, the choices made in domains O and W affect the structure of second-order jural relations within the firm and thus m 's decisional power.

High and low concentrations of interests correspond to different levels of safeguards within the firm. If o chooses O_H (O_L) it is relatively easy (difficult) for shareholders to influence and control the activities of m . Shareholders have strong (weak) safeguards on their interests in their firm. We define this case as a situation in which the power (inability) of o corresponds the liability (immunity) of m . Similarly, if w chooses W_H (W_L) it is relatively easy (difficult) for workers to affect the firm's operations via the threat of collective action. Workers can enjoy strong (weak) safeguards on their jobs. In this case, we say that the inability (power) of m is counterbalanced by the immunity (liability) of w . On this basis, for each combination of O and W we can define a specific structure of second-order jural relations². In particular, by calling the relations between o and m ‘upstream relations’ and the ones between m and w ‘downstream relations’, we have the structure³ depicted in Table 1.

[Table 1]

The decision-making process proceeds as follows. Agents o and w choose in their domain of choice to maximize individual utility. In particular, o selects the degree of ownership concentration that maximizes utility u_o for a given concentration of workers' interests, while w selects the degree of

interest concentration that maximizes u_w for a given ownership structure, where u_i (for $i = o, w$) is agent i 's utility. Note that, in this framework, the actions of o and w involve two distinct causalities: the actions of o capture Roe's (2003) causality running from polity to ownership structure; whereas the actions of w imply the reversed causality running from ownership structure to polity, as suggested by Belloc and Pagano (2009, 2013).

Agents' utility depends on three components: economic compensation, exercise of choice freedom, and organizational rents. In addition, we assume that w incurs a cost of collective action when choosing concentrated interests because of the dispersed nature of labour (Belloc and Pagano, 2009). We write the agents' utility functions as follows:

$$u_o(O, W, t) = \rho_o(O, W, t) + z_o(O) + z_o(O, W) \quad (1)$$

$$u_m(O, W) = b + z_m(O, W) + z_m(O, W) \quad (2)$$

$$u_w(O, W) = s + z_w(W) + z_w(O, W) - c_w(W) \quad (3)$$

where $\rho_o(O, W, t)$ is the firm's profit, $b(> 0)$ and $s(> 0)$ are m 's and w 's economic compensation respectively, $z_o(O)$, $z_m(O, W)$ and $z_w(W)$ are freedom of choice functions, $z_o(O, W)$, $z_m(O, W)$ and $z_w(O, W)$ are organizational rent extraction functions, and $c_w(W)$, for $c_w(W_H) = c_w > 0$ and $c_w(W_L) = 0$, is w 's cost of collective action.

We assume that o appropriates all of the firm's profit. Depending on the degree of interest concentration and on the type of technical assets used in production, however, this profit can differ. Hence, we write $\rho_o(O_H, W_H, t) = \rho_{H,H}(t)$, $\rho_o(O_H, W_L, t) = \rho_{H,L}(t)$, $\rho_o(O_L, W_H, t) = \rho_{L,H}(t)$ and $\rho_o(O_L, W_L, t) = \rho_{L,L}(t)$ where t stands for technology. For the time being, we take technology as given. Later, we will remove this assumption and investigate how technical assets and interest concentration adapt each other. To make collective action an economically viable strategy we also assume $s > c_w$.

The second component in the utility functions is choice freedom. As suggested by the structure of relations reported in Table 1, the choices made in domains O and W affect the distribution of power within the organization and thus impact on agents' choice freedom. To capture this effect, we follow Pagano (1999) and represent power (p) as a continuum in the interval $[-1, 1]$, where $p = -1$ stands for full dependence on the power of others and $p = 1$ stands for full exercise of power over others. On this basis we define a freedom of choice function $Z(p)$ such that $Z(1) = Z$, $Z(-1) = -Z$ and $Z(0) = 0$, where $Z > 0$ represents the benefit (cost) associated with the exercise (lack) of choice

freedom. In this framework, $z(0)$ is a situation in which the distribution of power is even, *i.e.*, the inability of one agent is counterbalanced by the immunity of the other, and *vice versa*.

On this basis, we define the agent-specific freedom of choice functions by considering the two layers of authority relations depicted in Table 1. Agents o and m are involved in one type of authority relation, either upstream or downstream. Hence, their freedom of choice functions $z_o(O)$ and $z_w(W)$ can be defined as follows:

$$z_o(O) = \begin{cases} z, & \text{if } O = O_H \\ 0, & \text{if } O = O_L \end{cases} \quad z_w(W) = \begin{cases} 0, & \text{if } W = W_H \\ -z, & \text{if } W = W_L \end{cases}$$

Agent m , instead, is positioned in the middle of the hierarchy and is thus influenced by both upstream and downstream relations. In this regard, we call $z_m^u(O)$ and $z_m^d(W)$ m 's upstream and downstream freedom of choice functions, respectively:

$$z_m^u(O) = \begin{cases} -z, & \text{if } O = O_H \\ 0, & \text{if } O = O_L \end{cases} \quad z_m^d(W) = \begin{cases} 0, & \text{if } W = W_H \\ z, & \text{if } W = W_L \end{cases}$$

On this basis, m 's degree of choice freedom is defined as $z_m(O, W) = z_m^u(O) + z_m^d(W)$. To ensure that the firm is economically viable we assume $z < s$ and $z < b$.

The last component of the utility function is organizational rent. Whenever a mismatch between the degrees of concentration in domains O and W arises, it is possible for o and w to collude with m in the extraction of upstream and/or downstream rents. Under combination (O_H, W_L) , for instance, o and m can exploit their position of relative power to extract organizational rents from w . By selecting working conditions that are more favourable to o than to w , in fact, m can transfer resources from labour to capital while obtaining a compensation for her service. This is possible because the lack of safeguards to protect w 's interest limits the ability to oppose such collusion. Similarly, under (O_L, W_H) w can exploit their immunity position to offer m a collusion agreement going in the opposite direction, *i.e.*, it makes m transfer resources from capital to labour in exchange for an appropriate compensation, which partially compensate for the lack of downstream power. This makes the collusion agreement economically convenient for m . In addition, organizational rents can be extracted even under combination (O_L, W_L) . In this case m enjoy both upstream immunity and downstream

power. Although the impossibility of reaching collusive agreements limits the size of the rent, the fact that the latter can be extracted both upstream and downstream makes its size not negligible.

We assume that agents o and w have a fall-back position equal to zero, and we call $z_u(L, j) = \rho_{L,j}(t)$ (for $j = H, L$) and $z_d = s - Z$ the upstream and downward rents extracted from capital and labour respectively. Under combination (O_L, W_L) , we assume that m can extract only a fraction ε of the upstream and downstream rents, where $e > 0$ is a measure of m 's decisional authority. On this basis we define the organizational rent extraction functions as follows:

$$z_o(O, W) = \begin{cases} 0, & \text{if } O = O_H \wedge W = W_H \\ (s - Z)/2 & \text{if } O = O_H \wedge W = W_L \\ -\rho_{L,H}(t) & \text{if } O = O_L \wedge W = W_H \\ -e\rho_{L,L}(t) & \text{if } O = O_L \wedge W = W_L \end{cases}$$

$$z_w(O, W) = \begin{cases} 0, & \text{if } O = O_H \wedge W = W_H \\ -(s - Z) & \text{if } O = O_H \wedge W = W_L \\ \rho_{L,H}(t)/2 & \text{if } O = O_L \wedge W = W_H \\ -e(s - Z) & \text{if } O = O_L \wedge W = W_L \end{cases}$$

$$z_m(O, W) = \begin{cases} 0, & \text{if } O = O_H \wedge W = W_H \\ (s - Z)/2 & \text{if } O = O_H \wedge W = W_L \\ \rho_{L,H}(t)/2 & \text{if } O = O_L \wedge W = W_H \\ e(\rho_{L,L}(t) + s - Z) & \text{if } O = O_L \wedge W = W_L \end{cases}$$

where we assume that, under all combinations, the collusion agreement foresees an equal split of the rent between the colluding parties.

[Table 2]

On this basis, the antagonistic interaction between o and w can be represented in game theoretic form by the triplet $G = \{I, Q, u\}$, where $I = \{o, w\}$ is the set of players, $Q = O \times W$ is the set of strategy profiles and $u = \{u_o(q, t), u_w(q)\}$ for $q \in Q$ is the vector function of the players' payoff, where $u_o(q, t)$ and $u_w(q)$ are given by Eqs. (1) and (3). Table 2 reports a normal-form representation

of game Γ , with the payoff of m (who is not involved in the class struggle) in squared brackets. Let us introduce the following definitions:

Definition 1. A politics-business arrangement in game Γ corresponds to a pure strategy profile $q = \{q_o, q_w\} \in Q$, where $q_o \in O$ and $q_w \in W$ is the pure strategy adopted by players o and w , respectively.

To every politics-business arrangement corresponds a specific way to resolve the conflict between workers and owners. In particular, game Γ offers a representation of four distinct arrangements, namely $\{O_H, W_H\}$, $\{O_H, W_L\}$, $\{O_L, W_H\}$ and $\{O_L, W_L\}$. In this set we are interested in the combinations that qualify as self-sustaining equilibria. We call the latter politics-business varieties:

Definition 2. A politics-business arrangement $q^* = \{q_o^*, q_w^*\}$ is a politics-business variety if the corresponding pure strategy profile is a Nash equilibrium (NE) of game Γ .

On this basis, the following proposition holds (all proofs are in the Appendix):

Proposition 1. Suppose $Z < s$, $Z < b$ and $s > c_w$. Then: a) for any t , $\{O_L, W_H\}$ and $\{O_H, W_L\}$ are never politics-business varieties; b) for any $\rho_{L,L}(t) < \rho_{L,L}^*(t)$ or $c_w(t) < c_w^*(t)$, where

$$\rho_{L,L}^*(t) = \frac{1}{1-e} \left(\rho_{H,L}(t) + \frac{s+Z}{2} \right) \quad c_w^*(t) = \frac{\rho_{L,H}(t)}{2} + Z + e(s-Z)$$

$\{O_H, W_H\}$ is the only politics-business variety; c) if $\rho_{L,L}(t) \geq \rho_{L,L}^*(t)$ and $c_w(t) \geq c_w^*(t)$, then two politics business-varieties exist, namely $\{O_H, W_H\}$ and $\{O_L, W_L\}$.

Proposition 1 suggests that, depending on the value of the firm's profit and the cost of collective action, different types of politics-business varieties may exist. If either the profit obtainable under $\{O_L, W_L\}$ or the cost workers incur when concentrating their interests is sufficiently small, then $\{O_H, W_H\}$ is the unique equilibrium. In this case, owners have little to gain from ownership dispersion and O_H is their dominant strategy. The same applies to workers, for whom it is relatively

cheap to coordinate collective action. As a result, an arms race between owners and workers will make the variety $\{O_H, W_H\}$ self-sustaining.

The result is different, however, if a combination of external factors can dampen the conflict between owners and workers. To be effective, such factors should on the one hand raise the value of $\rho_{L,L}(t)$ relative to $\rho_{H,L}(t)$, thereby making ownership dispersion increasingly convenient for owners. For instance, this could take the form of a new set of technologies that makes governance models based on hired managers highly profitable. On the other hand, a symmetric group of factors should also increase the cost of collective action for workers, so that participation in class organizations becomes costly. In this case, both the weakening of class ideology and the implementation of *laissez-faire* interventions may serve the purpose. If both types of factors operate jointly, the race towards increased interests concentration can be blocked and a new type of dispersed equilibrium emerges. In these cases, multiple politics-business varieties can co-exist.

The existence of multiple politics-business varieties raises intriguing questions concerning the role of institutional changes. When both armament-like and disarmament-like antagonistic complementarities exist, the nature of the interactions between classes can be the source of institutional lock-in, which impedes the transition from one institutional arrangement to the other. In this regard, two important aspects need to be considered. The first concerns the asymmetry that characterizes the role of economic and political forces in fostering changes within the property and polity domains. While politics is essential to curb capitalist concentration and to induce workers' unionization, it may be irrelevant in regard to the concentration of capitalist ownership and the dispersion of the workers' interests. Spontaneous economic forces (by which we mean ordinary self-seeking behaviour in standard competitive markets) have a tendency to concentrate capital and to disperse labour (or, at least, to concentrate capital more than labour), whereas political forces are necessary to disperse capital and concentrate labour. This in turns implies that a mix of both economic and political forces is needed for institutional change to occur.

The second important aspect to be considered concerns the role of technology. Distinct types of antagonistic complementarities can create incentives for agents to invest in different technologies, which make transitions across distinct equilibria even more difficult. The stabilizing effect of technology, in particular, is strengthened by the existence of synergetic complementarities between corporate rights and assets. As the next section will show, such complementarities can indeed increase the institutional stability of each variety.

3. Corporate rights and assets synergetic complementarities

Alongside diversity in the degree of ownership concentration and social democracy, corporate governance systems differ also in terms of organizational assets. Although the evidence is far from conclusive (Schneider and Paunescu, 2012), alternative arrangements stemming from stakeholders antagonistic complementarities tend to be associated with specific comparative advantage in the accumulation of corporate assets, which in turn give rise to diverging patterns of industrial specialization and innovation across countries (Schneider et al., 2010; Lehrer, 2000; Casper and Whitley, 2004; Love and Roper, 2004; Simoni, 2015; 2012). This evidence points at the existence of multifaceted interdependences in economic systems between the political and organizational level, whose nature has not been fully investigated. In this section we aim to make a first step in this direction by developing a micro-founded model of institutional evolution that combines both levels of analysis.

As far as corporate rights and assets are concerned, their relation is a controversial issue in social science. Causation can go both ways. On the one hand, corporate rights can be seen as factors shaping the nature and the characteristics of corporate assets. On the other hand, corporate assets can be considered to be the cause of changes in the system of rights.

New Institutional Economics⁴ (NIE) has furnished a rationale for the second direction of causation. In a world of positive transaction costs and contract incompleteness, it is argued, the characteristics of the resources and assets used in production (*i.e.*, the nature of technology) affect the allocation of corporate rights. Under the force of competition, in particular, corporate rights will be designed so as to minimize the sum of transaction and production costs. By doing so, organizations can improve efficiency and enjoy a competitive advantage in the market. This in turn makes efficiency-enhancing corporate rights predominant in the economy.

The technological neutrality of corporate rights implicit in NIE, however, has been strongly criticized (e.g., Marglin, 1974; Rowthorn, 1974; Pagano, 1985; Bowles, 1985). Braverman (1974), for instance, argued that the characteristics of the assets employed under classical capitalism were outcomes of its corporate rights. This view implies a substantial inversion of the standard NIE line of reasoning. In a world of positive transaction costs, when given a certain allocation of corporate rights, agents have an incentive to adopt technical assets minimizing the costs associated with the initial rights. As a result, also in this case we should expect corporate assets and rights to optimally adjust to each other, except that now the direction of causation is reversed. Whereas the NIE approach views causality as running from corporate assets to rights, under this approach causality runs from corporate rights to corporate assets.

Although these two views have often been considered antithetical (Williamson, 1985), they are not mutually exclusive. On the contrary, both causalities are likely to hold at the same time (Pagano,

1993). If so, economic organizations qualify as self-sustaining institutions in which for any given set of corporate assets (rights) there exists an optimal allocation of corporate rights (assets). This two-way relationship leads to situations of ‘organizational equilibrium’ (OE), where rights self-reinforce via technical assets and *vice versa*. Following Aoki (2001) this self-reinforcing relation can be the source of institutional complementarities, with the obvious consequence that, when such complementarities obtain, multiple OE may exist.

The notion of OE has found several applications in the literature (Pagano and Rowthorn, 1994; Pagano and Rossi, 2004; Pagano, 2011; Earle et al., 2006; Landini, 2012, 2013). The key insight that emerges is that in social systems neither are technical assets *rights-neutral* nor are institutional arrangements *technology-neutral*. Most often, technical assets and organizational rights adjust each another in synergetic ways.

The synergetic relation between corporate assets and rights adds a variable to the politics-business framework discussed in Section 3. In addition to conflict between owners and workers, the nature of capitalism is also affected by the specific ways in which technology and politics-business arrangements adjust each other. The combination of these distinct relations is at the very root of the Marxian theory of history, where both conflicts and synergies play an essential role. According to Marx, in fact, two main forces shape history: social class conflicts and the synergetic adaptation of productive forces and production relations. On this view, capitalism is a system in which antagonistic and synergetic complementarities co-exist and are the main drivers of the system’s evolution.

To model the co-existence of antagonistic and synergetic complementarities we extend the model of Section 3, where four politics-business arrangements existed: $\{O_H, W_H\}$, $\{O_H, W_L\}$, $\{O_L, W_H\}$ and $\{O_L, W_L\}$. Previously, we studied such arrangements in a 2×2 static game while taking technology as given. Now, we extend the model into a dynamic population game and study the synergetic adaptation of technical assets to the politics-business structure.

We assume that the economy is populated by a large number of $n_o (>0)$ owners, $n_w (>0)$ workers, and $n_m (>0)$ managers. Every period agents o , m and w randomly meet in groups of three (one for each agent type) to play one round of the stage game described in Section 3. We call $\omega(\hat{1} [0,1])$ the fraction of o adopting strategy O_H and $r(\hat{1} [0,1])$ the fraction of w adopting strategy W_H .

Given the degree of concentration that is chosen by each pair of o and w , m chooses the type of technical assets. For any politics-business arrangement $\{O_j, W_j\}$ (for $j = H, L$) we define the type of technical assets $t_{j,j}$ as the degree of intensity in the use of firm-specific managerial knowledge relative to other factors of production such as capital and labour: the higher (lower) $t_{j,j}$, the larger (smaller) the use of managerial knowledge relative to capital and labour.

In line with the property-rights-causes-technology view we assume that m sets $t_{j,j}$ taking into account two components: the type of politics-business arrangement and the strength of the economy-wide concentration in corporate rights. The combination of these two components determines the cost of managerial knowledge relative to other factors of production and thus the value of $t_{j,j}$.

More in detail we assume that whenever m is matched with combination either $\{O_L, W_H\}$ or $\{O_H, W_L\}$ she selects a fixed combination of factors of production whose intensity \bar{t} is normalized to zero (i.e., $t_{L,H} = t_{H,L} = \bar{t} = 0$). In other words, we assume that, in these two cases, the asymmetric concentration of corporate rights and workers' interests balance out by moving in opposite directions and do not change managers' incentives to invest in firm-specific knowledge. We take this investment level as our benchmark.

When m is matched with combination $\{O_H, W_H\}$, on the contrary, the presence of both upstream liability and downstream inability increases the relative cost of firm-specific managerial knowledge compared to the benchmark, so that $t_{H,H} < \bar{t} = 0$. This is because m is both exposed to the power of o and unable to exercise authority of w , so that she will require costly safeguards before making firm-specific investments. In particular, the cost of such investments will be higher the greater the power exercised by o , which can be proxied by the economy-wide concentration of corporate rights W ⁵. On this basis, we write $t_{H,H} = -W$, where we assume that the lower bound of $t_{H,H}$ is achieved when the economy-wide concentration of corporate rights is maximal, i.e., $W = 1$.

For similar but opposite reasons under combination $\{O_L, W_L\}$ the presence of both upstream immunity and downstream power reduces the relative cost of firm-specific managerial knowledge compared to the benchmark, so that $t_{L,L} > \bar{t} = 0$. In this case the size of this cost reduction will be larger the greater the degree of m 's immunity with respect o 's power, which can be proxied by $1 - W$ ⁶. On this basis, we write $t_{L,L} = 1 - W$, where we assume that the upper bound of $t_{L,L}$ is achieved when the economy-wide concentration of corporate rights is minimal, i.e., $W = 0$.

In line with the technology-cause-property-rights view we also assume that the value of t is non-neutral with respect to the firm's profit. In particular, we write the firm's profit under $\{O_H, W_H\}$ and $\{O_L, W_L\}$ respectively as $\rho_{H,H}(t_{H,H}) = \rho_{H,H} - \alpha t_{H,H}$ and $\rho_{L,L}(t_{L,L}) = \rho_{L,L} + \alpha t_{L,L}$, where $\alpha (> 0)$ is a parameter capturing the size of the profit surplus (or loss) due to the combination of technical assets. In presence of $\{O_H, W_H\}$ the exposition to o 's power and the immunity of w makes firm-specific managerial knowledge relatively expensive. In these cases the cognitive advantages associated with a technology that is intensive in managerial knowledge are less than compensated by its agency costs and the firm's profit decreases with $t_{H,H}$. Such premium on agency costs, however, is saved under

$\{O_L, W_L\}$, because m 's upstream immunity and downstream power provide sufficient safeguards. In these cases the cognitive advantages of using managerial knowledge more than compensate its agency cost and the firm's profit increases with $t_{L,L}$. In presence of arrangement $\{O_L, W_H\}$ ($\{O_H, W_L\}$) $t_{L,H}$ ($t_{H,L}$) takes its benchmark value and the firm earns no profit surplus (or loss).

On this basis we can rewrite the game payoff as follows:

[Table 3]

To provide a framework for studying asymptotic stability we restrict the analysis to the cases in which two politics-business varieties exist. Given the new structure of the game payoff, the conditions reported in Proposition 1 reduce to

Assumption 1.

$$\rho_{L,L} + a(1 - w) > \frac{1}{1 - e} \left[\rho_{H,L} + \frac{s + z}{2} \right] \text{ and } c_w > \frac{\rho_{L,H}}{2} + z + e(s - z) \quad " a > 0 \cup w \in [0, 1].$$

We can now study the evolution of corporate governance and politics institutions under both antagonistic and synergetic complementarities. To this aim we assume that the presence (or absence) of formal class organizations affects the type of information observed by agents and it thus creates an asymmetry in their capacity to influence population-level institutions. In particular, while o and w can exploit "meetings" taking place in their formal class organization to observe decisions taken across different firms, m cannot. This obviously does not mean that agents m have no specific class interest, but simply that they have less power to influence population-level institutions compared to o and w .⁷ It follows that institutional change can be studied by looking at how the degree of concentration in domains O and W evolves, technical assets resulting from the synergetic adaptation of technology to such institutional arrangements.

To study institutional change we consider a stylized process of social interactions. Lacking specific assumptions on the shape of such interactions, we choose not to impose any *a priori* social structure. This allows us to keep full traceability of the results, making it possible to derive a complete characterization of the equilibrium outcomes. Extensions looking at how richer characterizations of the social structure (e.g. local interactions, network topologies) affect the observed institutional dynamics are possible and are left to future research. With respect to the behavioural decision rules our modelling strategy differs from most standard economic models, in that we do not assume

unbounded cognitive abilities of individual agents. Rather we rely on empirically (mostly experimentally) grounded assumptions in which agents update their beliefs by trial-and-error methods using local knowledge based on their and others recent past experience (Bowles, 2009). In this sense our modelling strategy appears more suitable for studying individual decision-making in institutionally embedded environments than most alternative formal options.

In particular, institutional change takes place through the following process. In every period o , w and m randomly meet to play the game described in Table 3. Once the politics-business arrangement is determined, m selects the value of t and all the agents obtain the corresponding payoff. The status of the economy can be described by the pair $\{w, r\}$. Assuming that the size of the economy is sufficiently large, $\{w, r\}$ will also denote the probability with which agents meet across types. On this basis, for any given value of ρ and taking into consideration the payoffs reported in Table 3, we can write o 's expected payoffs as follows:

$$V_H^o = r(\rho_{H,H} + aw + z) + (1 - r)\left(\rho_{H,L} + z + \frac{(s - z)}{2}\right)$$

$$V_L^o = (1 - r)[\rho_{L,L} + a(1 - w)](1 - e)$$

for strategies O_H and O_L respectively. Similarly, for any given value of ω , the expected payoffs to workers are respectively:

$$V_H^w = w(s - c_w) + (1 - w)\left(s + \frac{\rho_{L,H}}{2} - c_w\right)$$

$$V_L^w = (1 - w)(s - z)(1 - e)$$

These expected payoff functions are illustrated in Figure 1.

[Figure 1]

To model the co-evolution of property and polity, suppose that both o and w update the degree of corporate right and interest concentration (respectively) by best responding to the distribution of types in the previous period. In particular, suppose the updating process works as follows. In any time period both o and w are exposed to a cultural model randomly selected from their own class. For instance, an owner, named A, has the opportunity to observe the corporate right concentration

selected by another owner, named B, and to know her expected payoff with a probability b . If B has selected the same corporate right concentration as A, A does not update. But if B has selected a different degree of corporate right concentration, A compares the two payoffs and, if B has a greater payoff, switches to B's degree of concentration with a probability equal to $g(> 0)$ times the payoff difference, retaining her own degree of concentration otherwise (where g is a constant reflecting the greater effect on switching of relatively large differences in payoffs, appropriately scaled so that the probability of switching varies over the unit interval). The same procedure takes place among workers. It is easily shown that this process of payoff monotonic updating gives the following replicator equations:

$$DW = w(1 - w)bg(V_H^o - V_L^o) \quad (4)$$

$$Dr = r(1 - r)bg(V_H^w - V_L^w) \quad (5)$$

where DW and Dr are the changes in the degree of corporate rights and workers' interest concentration between any two periods. Eqs. (4) and (5) represent a system of differential equations which describes how the distribution of types $\{w, r\}$ changes over time. Given this dynamics, we are mainly interested in the stationary states of the economy, namely the states for which $DW = 0$ and $Dr = 0$. Such states represent fixed-points of the dynamical system, and politics-business equilibria of the economy.

Proposition 2. *Suppose that two politics-business varieties exist (Assumption 1). Then the dynamical system composed of Eqs. (4) and (5) is characterized by five politics-business equilibria: $\{0,0\}$, $\{0,1\}$, $\{1,0\}$, $\{1,1\}$ and $\{w^*, r^*\}$, with*

$$r^* = \frac{Y - Z}{Y + \rho_{H,H} + aW}$$

$$w^* = \frac{c_w - \rho_{L,H}/2 - Z - e(s - Z)}{(s - Z)(1 - e) - \rho_{L,H}/2}$$

where $Y = [\rho_{L,L} + a(1 - w)](1 - e) - \rho_{H,L} - (s - Z)/2$. *Out of these five equilibria, only two are asymptotically stable, namely $\{0,0\}$ and $\{1,1\}$; equilibrium $\{w^*, r^*\}$ is a saddle, whereas equilibria $\{0,1\}$ and $\{1,0\}$ are unstable.*

[Figure 2]

The vector field in Figure 2 offers a graphical representation of the content of Proposition 2. The arrows indicate the out-of-equilibrium adjustment. For states $W < W^*$ and $r < r^*$, both DW and Dr are negative and the economy will move to $\{0, 0\}$. This state corresponds to a politics-business equilibrium characterized by low concentration of corporate rights and workers' interests as well as high $t_{L,L}(= 1)$; we will call the latter Equilibrium 0 (E_0). Analogous reasoning holds for states $W > W^*$ and $r > r^*$, where the economy converges to $\{1, 1\}$. In this case the stable state corresponds to a politics-business equilibrium characterized by high concentration of corporate rights and workers' interests as well as low $t_{H,H}(= -1)$; we will call the latter Equilibrium 1 (E_1). In the remaining regions of the state space, we may identify a locus of states (dashed downward-sloping line) for which the system will transit to the interior equilibrium $\{W^*, r^*\}$, with states below that locus transiting to E_0 , and above the locus to E_1 . State $\{W^*, r^*\}$ is stationary, but is a saddle. Two additional unstable stationary states are $\{1, 0\}$ and $\{0, 1\}$, but are of no interest. All the area below the short-dashed downward-sloping line represents instead the basin of attraction of E_0 , and all the area above it the one of E_1 . These two corner solutions are thus the absorbing states of the dynamic process.

The above dynamics suggests that overtime the economy is likely to converge to one of two very different equilibria. In one of them, namely E_0 , a homogeneous population of owners with low concentration of corporate rights interact overtime with workers adopting low concentration of class interests. In the other, namely E_1 , a population dominated by owners with high concentration of corporate rights interact with workers characterized by high concentration of class interests. These two equilibria are also organizational equilibria in the sense discussed above. To see why let us consider the case of E_1 . In this equilibrium the predominant politics-business arrangement is such that profit is maximized when $t_{H,H}$ is minimum (i.e. $t_{H,H} = -1$). At the same time the high concentration of corporate rights makes managers more likely to select a composition of technical assets that is characterized by low intensity of managerial knowledge (i.e. $t_{H,H}$ decreases). In equilibrium the high concentration of class interests self-reinforce *via* a technology that use relatively little managerial knowledge, and *vice versa*. Analogous reasoning holds for E_0 . In other words, the synergetic adaptation between technical assets and corporate rights stabilizes the two equilibria.

A direct implication of this synergetic adaptation is that equilibria E_1 and E_0 differ not only in terms of politics-business arrangement but also in terms of techniques. While in E_1 the equilibrium technique is relatively intensive in the use of capital and labour, in E_0 it is relatively intensive in the use of managerial knowledge. The latter condition is combined with a relatively stronger position of managers in E_0 than in E_1 . This situation is likely to create a dramatic situation of asymmetric information between managers and the owners of the other factors of production that can explain the astronomic retributions that, according to Piketty (2014), characterize the retributions of some American super-managers.

The extent to which one of these two equilibria will actually be the politics-business equilibrium of the economy depends on two interrelated factors. First of all, for any given size of the basins of attraction, the emergence of E_1 as opposed to E_0 (and *viceversa*) is more likely, the more probable the initial distribution of types in the economy to fall within E_1 's (or E_0 's in the opposite case) basin of attraction. This implies that, there exists path dependency in the way in which the economy evolves. Secondly, for any given initial distribution of types, the emergence of one of the two absorbing states as the final resting point of the dynamics depends on the size of its basin of attraction. In particular, the greater the basin of attraction of one state relative to the other, the more likely such state to become the politics-business equilibrium of the economy. On this respect, it is important to notice that:

Remark 2. $\partial r^* / \partial \epsilon < 0$, $\partial w^* / \partial \epsilon < 0$ and $\partial w^* / \partial c_w > 0$ imply that, for any initial distribution of types, the emergence of E_0 as the politics-business equilibrium of the economy is more likely, the lower the degree of managerial authority (ϵ) and the higher w 's cost of collective action (c_w).

The content of Remark 2 is represented in Figure 3. Panel (I) shows how the size of the two basins of attraction varies when the strength of managerial authority reduces from ϵ to ϵ' (e.g. thorough *ad-hoc* incentive mechanisms within the corporation). As we can see the curves r^* and w^* shift respectively upward and rightward and their intersection moves from A to B. As a result the basin of attraction of E_0 increases while the one of E_1 decreases. Everything else equal this should make E_0 more likely to emerge. Similarly, panel (II) shows what happen to the basins of attraction of the two equilibria when w 's cost of collective action rises from c_w to c_w' (e.g. thorough the weakening of class ideology). In this case too w^* shifts rightward, while the position of r^* remains unchanged. Such a change makes E_0 more likely to emerge as the stable state of the population.

[Figure 3]

When both concentrated and dispersed politics-business equilibria exist, it is interesting to investigate their relative efficiency. From the social point of view, in fact, convergence towards one equilibrium as opposed to the other has strong effects on the distribution of welfare. In this regard, it should be noted that, in the standard arms race argument, the mutual disarmament equilibrium (*i.e.*, dispersion), is likely be Pareto superior. Under this equilibrium, in fact, both types of agents save the costs of investing in further armaments and can avoid conflict. By contrast, in our case it is not possible to *a priori* rank equilibria. The synergetic adaptation of technical assets may induce economies with different politics-business arrangements to accumulate distinct types of technologies, and thus to specialize in different industries (Belloc and Pagano 2012). The total welfare generated at the equilibria E_0 and E_1 may thus depend on the profit that firms earn in these industries, and the ranking of equilibria can vary. In particular, we obtain the following result:

Proposition 3. *Suppose that two politics-business varieties exist. Then: a) If $\rho_{L,L} < \rho_{L,L}^*$ where $\rho_{L,L}^* = (\rho_{H,H} + z + e\alpha) / (1 - e)$, then E_1 and E_0 are not mutually Pareto comparable; b) If $\rho_{L,L} \geq \rho_{L,L}^*$, then E_0 is Pareto superior; c) The greater e and α , the smaller the set of parameters for which E_0 is Pareto superior; d) Two unstable equilibria characterized by asymmetric concentration of class interests are never Pareto superior.*

The intuition behind Proposition 3 is straightforward. Managers are always better off in E_0 , where the combination of upstream immunity and downstream power favours both the extraction of rents and the enjoyment of choice freedom. This in turn implies that equilibrium E_1 can never be Pareto superior. For workers, the dominance of one equilibrium depends on two components: ε and c_w . Whenever ε is sufficiently low and c_w is sufficiently high, workers are better off in E_0 . In these cases, in fact, the cost of being subject to m 's power is more than offset by the possibility to avoid the collective action problem associated with interest concentration. In particular, we find that for the set of parameters in which both $\{O_H, W_H\}$ and $\{O_L, W_L\}$ are viable politics-business varieties (see Proposition 1) this condition is always satisfied, so that workers always prefer E_0 . It follows that the Pareto superiority of the dispersed equilibrium rests on the utility gained by owners, and in particular on the value of the firm's profit. As long as the profit obtainable through dispersed ownership when

combined with a technology that is relatively intensive in the use of managerial knowledge is above a certain threshold, E_0 is Pareto superior. Otherwise, E_0 and E_1 are not Pareto comparable. Moreover, we find that the set of parameters for which the two equilibria are not Pareto comparable is larger, the stronger the managers' decisional authority and the greater the profit surplus due to the composition of technical assets. On this respect it is important to notice that while the synergetic adaptation of technical assets and corporate rights adds to profit in both E_1 and E_0 , in the latter case the owner can appropriate a fraction $(1 - e)$ of this surplus, which contributes to make the two equilibria Pareto unrankable. Finally, we find that the two unstable equilibria characterized by asymmetric concentration of class interests can never be Pareto superior (due to the asymmetric extractions of organizational rents).

The impossibility of ranking equilibria for a large proportion of the parameter space differentiates our results from those of the previous literature. Both the legal origins (La Porta et al., 1999) and the electoral system approach (Pagano and Volpin, 2005) draw up a ranking of the different corporate governance models and suggest consequent measures for public policies. Differently from our approach, this literature considers only a one-way causality as determining ownership concentration, and does so by relying on either the degree of shareholder protection or the proportionality of the voting system. None of these approaches discusses the existence of institutional complementarities in corporate governance systems, and the co-evolutionary dynamics that the latter entail. Belloc and Pagano (2013) report empirical evidence supporting the superiority of the co-evolution approach over competing theories. In this respect, our results complement this evidence by identifying the variables that contribute to making concentrated and dispersed equilibria Pareto unrankable. Among the latter, the strength of managers' decisional power (or even the abuse of such power) and the associated inefficiencies of the dispersed equilibrium play a particularly relevant role.

4. Conflicts and assets complementarities in corporate governance history

Figure 4 shows the empirical relation between the level of employment protection and the dispersion of ownership. Concentrated ownership and high employment protection can be interpreted as high-level armaments that both owners and workers have adopted. In terms of Section 2, the countries on the left of Figure 4 approximate the $\{O_H, W_H\}$ equilibrium where both owners and workers have concentrated their interests. By contrast, the countries on the right of Figure 4 (mainly the US) approximate the $\{O_L, W_L\}$ equilibrium where the interests of both owners and workers are dispersed.

[Figure 4]

The US and most European countries are characterized by different types of antagonistic complementarities. The focus of most European countries has been the ‘social governance’ of conflict between owners and workers, while the American political and economic debate has concerned ‘firm-level’ governance of conflict between managers and dispersed ownership. The German co-determination system (as well as most European systems of industrial relations) “originated in the social movements of late nineteenth-century Europe”. By contrast “corporate governance is a younger concept” which emerged “not in response to social conflicts, but rather as results of developments in the American economy, which seemed to be giving dispersed shareholders less and less control and allowing manager to become even stronger.” (Pistor 1999: 164). Consequently, in the American system the debate has focused on shareholder protection – a policy less relevant (and sometimes even counterproductive) in countries with concentrated block-holding (Milhaut and Pistor, 2008)

In the late nineteenth century, social conflicts played a much less important role in the US than in Europe. The reason is that the early emergence of democracy enabled an exceptional American historical path different from those of most European countries (Pagano, 2013).

At the beginning of the second half of the nineteenth century, the US was the only country (perhaps besides Switzerland⁸) where the landed aristocracy had no political power. Because of its anti-aristocratic attitude, the US reacted early to the concentration of economic power which came with the second industrial revolution. The Sherman Act (1890) was the first, and by far the most important, piece of anti-monopoly legislation to be enacted in a modern economy. After Theodore Roosevelt’s clashes with big business, Wilson continued to set limits on the power of the major block-holders. The Clayton Act (1914) ruled that the ownership of substantial stakes in different firms may induce self-dealing and unfair competition and should therefore be supervised by anti-trust authorities. F.D. Roosevelt completed these policies by using taxation to dismantle the pyramids (Randall, 2004) that, in many cases, had enabled a few “economic royalists” to use “other people’s money” to impose a “new industrial dictatorship” (Roosevelt quoted by Roe, 1994: 40).

The same strong democratic state was able to limit the power of the unions also because workers had fewer incentives to organize, given the dispersion of shareholder power. Because of the dispersion of shareholder and union power, managers had considerable power and the American corporation became known as the typical kind of managerial firm. Managers were filling a vacuum that was open by a disarmament compromise between two organized classes, under the jealous power of an early democratic state. They were not an organized class. However, as our model predicts, they

were far from inactive in filling this space. They exploited the rights that the system had given them to make save investments in human capital, which in turn reinforced their power in the corporations⁹. It took few decades to transform them in the American supermanagers that, as Piketty (Chapter 7, 2014) shows, could become as wealthy as the richest members of the traditional capitalist class.

In all the other countries, aristocratic privileges were quite widespread and no strong democratic state could act early against the concentration of power which came with the industrial revolution. The new bourgeois class internalized many values of the aristocracy, including respect for individuals who had inherited large amounts of wealth and some contempt for the new rich. Ever since the ‘Glorious Revolution’, Britain was characterized by an important role of the aristocracy (which fought against and executed the king)¹⁰, and in post-Napoleonic France the aristocracy had regained many privileges. In the mid-nineteenth century, the power and values of the aristocracy went even more unchallenged in Germany and in other parts of Europe. As a result, the growth of firms' size, which came with the second industrial revolution, coincided with an increase in the power of the capitalist family dynasties, which, thanks to pyramids and financial connections, could control a range of activities much greater than that allowed by their wealth. Managers had little independence from owners. Usually, good managerial positions were given to family members or to their acquaintances. Faced with the concentration of the owners' power, also workers had strong incentives to protect their interests through centralized unions and by promoting legislation aimed at protecting their jobs.

In line with our model, the diverse antagonistic complementarities of the US and the European countries have involved different synergetic complementarities with the assets, the technology, and in general the environment with which they have co-evolved. Also in this instance, the synergic complementarities have stabilized the outcome of conflicts that, in this case, were the rights and the institutions stemming from the antagonistic complementarities of the different class strategies.

The American dispersed equilibrium encourages investment in human skills of managers, the diversification of ownership, and the concentration of large amounts of capital in corporations. By contrast, it provides only very mild incentives for the human capital of owners and workers. Much specific knowledge concerning the company is concentrated in the hands of managers – a phenomenon that in turn enhances the relative stability of managerial hierarchies in comparison to the frequent changes of firms' affiliation of both absentee owners and workers. Whilst the figure of Taylor and the scientific management movement is often correctly associated with the de-skilling of workers, it can be equally seen as movement in favour of the skilling of professional managers, who were required to concentrate much of the knowledge that was traditionally dispersed among the workers (and some owners). The conditions of asymmetric information between managers and workers were not resolved by aligning workers' incentives, but rather by concentrating information

and capabilities in the hands of the managers. The American system therefore became a top-down system in the sense that much valuable information was heavily concentrated and a considerable flow of instructions ran from top management to workers. The fact that globalization implies that many workers may now be employed in foreign countries has not meant that the model has been abandoned; rather, that it has been successfully extended by using the opportunities provided by the global economy. Thus, a counterpart to the American 'dispersed equilibrium' is that, while owners and workers do not concentrate their interests, there is the tendency to adopt technologies characterized by the concentration of much knowledge in the hands of managers and by a system of 'top-down' instructions to the workers. Such technologies in turn make it 'efficient' to attribute substantial powers to managers, thus creating a self-sustaining path of interaction among politics, technical assets and corporate governance. Rights stemming from antagonistic complementarities are stabilized by their synergetic complementarities with technology. A model of corporate governance different from the European ones has emerged on the other side of the Atlantic and the large firms, made possible by dispersed ownership, prospered in the large American market.

The diversity of the European countries' histories¹¹ makes it difficult to find characteristics shared by their systems. However, they all seem to have a less pronounced diversification of ownership, a related small size of their firms, and a policy of employment protection associated with the greater power of the unions. This distribution of rights entails a stronger incentive for owners (and especially their heirs) to invest in the human capital necessary to run firms while, at the same time, employment protection creates the conditions favourable to firm-specific investments also for some workers. By contrast, investments in the human capital of managers is discouraged, and information – because it is more widely dispersed among some owners and workers – must often follow a bottom-up path. As in the American case, the technology, favoured by the European forms of corporate governance, reinforces in turn the distribution of rights characterizing these systems: concentrated owners and workers have a vested interest in finding the political safeguards that protect their investments in physical and human capital associated with this technology. Also in the European cases, the strong rights of employers and employees, arising from their antagonistic complementarities, have been stabilized by the adoption of synergic complementary assets.

The stabilizing effects of complementarities, however, should not be taken for granted. They do also involve that, when one complementary institutional piece is changed, also other pieces may change. England moved from the European model to arrangements close to the US. Initially, the English system was characterized by family capitalism with strong block-holders and strong unions. Mainly because of inheritance law and of the role of the City, its industrial sector underwent a dispersion of shares that made it an unstable hybrid of absentee capitalism and strong unions. In this

period corporate assets deteriorated. Finally, under Margaret Thatcher, unions were substantially weakened and a move towards a dispersed shareholder and weak unions equilibrium took place.

As the British example show complementarities do not only explain the institutional stability of varieties of capitalism but also the complex paths of transition from one variety to another.

5. Conclusion

This article has presented a simple model of antagonistic and synergetic complementarities in corporate governance systems. The insights of the model have been used to illustrate the evolution of distinct models of corporate governance in US and Europe. The explanatory power of the model, however, should not be overstated. Its aim is not so much to provide a complete account of the factors that played a role in the process of corporate governance variation worldwide. Rather, the model aims at providing a simplified framework to facilitate the comparative analysis of different corporate governance systems. This framework finds its rationale in the co-existence of multiple institutional complementarities, or institutional meta-complementarities as we have called them. In this setting we have focused on antagonistic complementarities among stakeholders and synergetic complementarities between corporate rights and assets. Future research will extend the model further so as to encompass other institutional meta-complementarities.

One of the main results of the model is that the combination of antagonistic and synergetic complementarities tends to increase the stability of corporate governance systems. In addition to the interlocking relation between ownership concentration and workers' organization, in fact, corporate assets tend to synergistically adapt to corporate rights. Such adaptation stabilizes the properties of the system making transitions across distinct configurations more difficult. This result, however, does not imply that institutional change is impossible. The history of England reveals that transition across different corporate governance models can occur: in these cases the need to reduce inefficiency due to mismatches between institutional complements can be an accelerating factor of transition.

Another important result of the model is that in presence of antagonistic and synergetic complementarities the relative superiority of alternative corporate governance models is not always granted. On this respect, we suggest that the strength of managerial rents and the diversified nature of corporate assets and profits can limit the supposed superiority of the dispersed equilibrium. Although these factors play a central role in the light of the recent economic crisis, they were rarely discussed in the previous literature.

Obviously, both the model and its historical application can be improved. First, it would be interesting to extend the model by considering a continuous degree of organizational concentration in the property and polity domains (see for instance Amable et al., 2005). This could certainly enrich

the analysis by considering corporate governance equilibria characterized by mixed degree of interest concentration. Second, it would be interesting to consider the factors that may lead one class of agents to force the transition to a new corporate governance model. In this sense the model could benefit from a stricter link with recent works on political coalitions and institutional change (Acemoglu and Robinson, 2013). Finally, the model could be improved by considering also a fourth actor, the state. Indeed, as recently discussed by Streeck (2014), the state and its obligation to finance ever more generous welfare state systems was one of the key drivers behind the financial sector deregulation and hence responsible for a shift towards more dispersed equilibria.

Appendix

Proof of Proposition 1

$\{O_H, W_H\}$ is proven to be NE as long as: (a) $\rho_{H,H}(t) + Z > 0$, and (b) $s - c_w > 0$. Condition (a) is self-explained. Condition (b) follows from assumptions (notice that $s > c_w$ by assumption). Similarly $\{O_L, W_L\}$ is NE as long as: (c) $\rho_{L,L}(t)(1 - e) > \rho_{H,L}(t) + Z + (s - Z)/2$, and (d) $(s - Z)(1 - e) > s + \rho_{L,H}(t)/2 - c_w$. Conditions (c) and (d) reduce to

$$\rho_{L,L}(t) > \frac{1}{1 - e} \left(\rho_{H,L}(t) + \frac{s + Z}{2} \right) = \rho_{L,L}^*(t) \quad \text{and} \quad c_w > \frac{\rho_{L,H}(t)}{2} + Z + e(s - Z) = c_w^*(t)$$

It follows that: (i) $\{O_H, W_H\}$ is always NE; (ii) when $\rho_{L,L}(t) < \rho_{L,L}^*(t)$ or $c_w(t) < c_w^*(t)$, conditions (c) or (d) above are violated, hence $\{O_H, W_H\}$ is the only NE (point *b* in the proposition); (iii) when $\rho_{L,L}(t) \geq \rho_{L,L}^*(t)$ and $c_w(t) \geq c_w^*(t)$ conditions (a), (b), (c) and (d) are all satisfied, hence both $\{O_H, W_H\}$ and $\{O_L, W_L\}$ are NE (point *c* in the proposition). Point *a* in the proposition follows from the fact that two necessary conditions for $\{O_L, W_H\}$ and $\{O_H, W_L\}$ to be NE are that O_L is a best-response to W_H and W_L is a best-response to O_H , but this is impossible as it would violate conditions (a) and (b) above. Hence, $\{O_L, W_H\}$ and $\{O_H, W_L\}$ are never NE.

Proof of Proposition 2

The politics-business equilibria are derived by solving the system (4)-(5) for $DW = 0$ and $Dr = 0$. The proof in this case is omitted. The asymptotic properties of each equilibrium are derived by analysing the Jacobian Matrix $J(w, r)$:

- At $\{0, 0\}$ $\text{Tr}(J) < 0$ and $\text{Det}(J) > 0$, hence $\{0, 0\}$ is asymptotically stable;
- At $\{1, 0\}$ $\text{Tr}(J) > 0$ and $\text{Det}(J) > 0$, hence $\{1, 0\}$ is unstable;
- At $\{0, 1\}$ $\text{Tr}(J) > 0$ and $\text{Det}(J) > 0$, hence $\{0, 1\}$ is unstable;
- At $\{1, 1\}$ $\text{Tr}(J) < 0$ and $\text{Det}(J) > 0$, hence $\{1, 1\}$ is asymptotically stable;
- At $\{w^*, r^*\}$ $\text{Det}(J) < 0$, hence $\{w^*, r^*\}$ is a saddle.

Proof of Proposition 3

E_0 is proven to be Pareto superior with respect to E_1 when moving from E_1 to E_0 at least one agent can be made better off without making any other agent worse off. From Table 2 we notice that m 's payoff is higher in E_0 than in E_1 whenever $b + z + e(\rho_{L,L} + a + s - z) > b - z$, which is always satisfied (notice that $s > z$ by assumption). Similarly, w 's payoff is greater in E_0 than in E_1 whenever $(s - z)(1 - e) > s - c_w$, which is always the case under Assumption 1. It follows that the Pareto superiority of E_0 depends on the payoff of o : if (a) $\rho_{H,H} + a + z \leq (\rho_{L,L} + a)(1 - e)$, o 's payoff in E_0 is greater or equal the payoff in E_1 ; otherwise o is better off E_1 . Condition (a) reduces to $\rho_{L,L} \geq (\rho_{H,H} + z + ea) / (1 - e) = \rho_{L,L}^*$. It follows that: (i) when $\rho_{L,L} < \rho_{L,L}^*$ condition (a) is violated and E_0 and E_1 are not mutually Pareto comparable (point a in the proposition); (ii) when $\rho_{L,L} \geq \rho_{L,L}^*$ condition (a) is satisfied and E_0 is Pareto superior (point b in the proposition). Point c in the proposition follows from the fact that $\partial \rho_{L,L}^* / \partial e > 0$ and $\partial \rho_{L,L}^* / \partial a > 0$. Point d in the proposition follows from the fact that a necessary condition for $\{O_L, W_H\}$ and $\{O_H, W_L\}$ to be Pareto superior is that no one loses moving to these institutional arrangements. However, this is impossible as in $\{O_L, W_H\}$ o is always worse off, while in $\{O_H, W_L\}$ w is always worse off. Hence, $\{O_L, W_H\}$ and $\{O_H, W_L\}$ are never Pareto superior.

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¹ "As the new class of professional managers rose to take over the American firm [...] they faced no counterweight of powerful financial institutions with big blocks of stock". (Roe, 1994 p. 5) In other words managers did not succeed as an organized class or lobby but by filling a vacuum of power that was created in the American system of large corporations.

² The concept of second-order jurial relations was introduced by Hohfeld (1919) and developed by Commons (1924). See also Pagano (2000).

³ Using the terminology of Gourevitch and Shinn (2005) low O and low W would roughly overlap with Managerism. High O and low W with some sort of Investor Model in which the managers act according to the needs of a dominant shareholder and the opposite case low O and high W with the labor power model where the managers are captured by the interests of the workers. Finally, high O and high W would represent the corporatist compromise, which can take different forms at company level or at the level of society. There is also some relation between Table 1 and the categories used by Aguilera and Jackson (2003). High O could be seen as concentrated capital exercising control via commitment whereas O (low) would represent dispersed capital exercising control only via liquidity. High W can be interpreted as labor endowed with strong representation rights and pursuing strategies of internal participation or also as labor able to

pursue effective strategies of external control. Low W can be regarded as labor unable to express a unified voice either via participation or via external control. In general, Table 1 expresses the preconditions for the contract among the three agents that following Durkheim's tradition cannot be part of the contract itself (Jackson 2006).

⁴ The NIE approach stems from Coase (1937, 1960) and includes Williamson (1985). The New Property Rights literature (Hart, 1995) follows the same direction of causation.

⁵ This way of modelling o 's power is equivalent to assume that the power exercised by owners increases with the strength of their class organization, where the latter is measured as the share of highly concentrated owners in the economy.

⁶ Once again this amounts to assume that the size of m 's immunity reduces with the strength of o 's class organization.

⁷ Notice that m 's inability to observe decisions taken across different firms may also derive from the fact that m 's choice pertains to the domain of technology, which is characterized by large information asymmetries.

⁸ There are similarities between the historical backgrounds of the US and Switzerland. Similarly to the US (where the war of secession terminated the political influence of the slave-owning landed aristocracy of the South) Swiss big business had "democratic origins" in the sense that a full-blown post-feudal society had already emerged before the second industrial revolution (Belloc and Pagano 2013).

⁹ Aoki (2010) suggests that, while standard theory views corporations only in terms of agency relations, they are also cognitive associations and that the first corporations were not business firms but learning organizations such as Universities. Business corporations accumulate and make use of knowledge in different ways and the rights, characterizing different models of capitalism, are not only biasing their models of learning but are also influenced by the latter.

¹⁰ In spite of the recent clustering of the US and Britain in the Anglo-American model, until the Thatcher years, England had institutions similar to those of the other European countries. In this respect legal origins cannot explain neither these institutions nor the recent British metamorphosis (Belloc and Pagano 2013).

¹¹ This diversity is even more dramatic if we include the case of Japan. Similarly to Germany Japan faced a strong state supporting the dominant zaibatsu families (Jackson 2001). However in absence of strong craft organizations and of strong centralized unions Japan developed a form of micro-corporatism at firm-level which involved a different system of training (Thelen and Kume 2001) and a different distribution of skills between workers and managers (Aoki and Jackson 2008). The divergence of the Japanese system from the European continental system was amplified by the post-war American occupation (Barca, Iwai, Pagano, Trento 1999).