

Bilateral hold-up in innovative firms: do and how labour laws matter?

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1. Introduction

In a globalized world, the ability of firms to successfully compete in the market of goods and services is increasingly a consequence of their ability to undertake innovative investments in new ideas and new knowledge. In this context, firms become innovative when they are able to combine multiple investments in relation-specific processes, by committing resources for sufficiently prolonged periods of time and by undertaking collective and cumulative processes of learning. Innovative firms are, in other terms, complex entities, involving multiple stakeholders in a process of firm-specific investment often characterized by a high degree of uncertainty and contractual incompleteness.

In the last three decades, an extensive literature has tried to investigate and explore, from various points of view, the nature of innovative firms as complex governance structures, starting from the original contributions of Grossman and Hart (1986) and Hart and Moore (1990) (the so-called “GHM framework”) and following distinct lines of research, including a relatively pure GHM approach (Aghion and Tirole, 1994), a broader stakeholder approach (Blair, 1995), an organizational control

approach (Lazonick, 2003; Carpenter *et al.*, 2003) and a more heterogeneous corporate governance approach (see Belloc (2012) for a survey).

A relatively more recent strand of literature has started to analyse the innovative performance of multi-stakeholder firms also in relation with firm-external institutional frameworks and with labour laws in particular (MacLeod and Nakavachara, 2007; Acharya *et al.*, 2013, 2014; Griffith and Macartney, 2014). The basic idea of this line of research is that labour regulations crucially influence the incentives to undertake relation-specific investments of firm members, by contributing to shape the distribution of control rights and profit rights between employers and employees within the firm.

The traditional mainstream literature, originally based on the Becker's theory (Becker, 1962, 1975) of employer's unilateral investments in human capital, argues that stringent labour regulations may reduce firm productivity, by inducing capital investment distortion (e.g., Bertola (1994), Autor *et al.* (2007)), by lowering firm efficiency (Bird and Knopf, 2009), by increasing firm adjustment costs (e.g., Garibaldi (1998), Mortensen and Pissarides (1999)), by discouraging working effort (e.g., Riphahn (2004), Ichino and Riphahn (2005)) and by inducing specialization in mature and stable technologies (e.g., Saint-Paul (2002)). By contrast, the literature based on a multi-stakeholder approach points to a positive effect of greater labour protection on firm investment levels and innovative performances. This latter literature specifically focuses on dismissal regulation and on its effect on the incentives to exert firm-specific effort by workers under the threat of firing. MacLeod and Nakavachara (2007), for example, find that wrongful discharge laws may lead to more productive relationships when employees' relation-specific investments are likely to be important. Similarly, Acharya *et al.* (2013, 2014) show that dismissal laws, preventing employers from arbitrarily discharging employees, limit employers' ability to extract rents at the expenses of innovating workers, and Griffith and Macartney (2014) – coherently with the “varieties of capitalism” intuitions (Hall and Soskice, 2001) – observe that employment protection effects on patent output tend to be larger in incremental innovation activities.¹

¹ A parallel line of micro-econometric study has also investigated how more flexible labour legislations, facilitating dismissal and short-term contracts, may indirectly hamper innovation, training and human capital development, by reducing the average duration of employment relationships in production processes requiring

Not only dismissal regulations, however, may influence investment activities and performance of knowledge-intensive firms. Labour regulations cover several other aspects which are likely to exert significant effects on firm-specific investments both by employers and employees, ranging from unions' rights to collective bargaining rules, from collective agreements regimes to board membership regulation. These other aspects of labour law, commonly referred to as employee representation legislations, are still under-explored in the existing economic literature on firm innovation. In this Chapter, we try to shed some light on the relationship between innovative firms' performance and labour laws, covering both dismissal regulation and employee representation regulation and analysing them in a typical GHM framework, where firms are required to integrate relation-specific investments of workers and employers in the presence of contractual incompleteness and bilateral hold-up risks. We will first recall the contribution of the GHM theory to the analysis of innovative multi-stakeholder firms (Section 2), we will then sketch a simple framework linking labour laws to innovation (Section 3), and in conclusion (Section 4) we will discuss how this framework may help us improving our understanding of the innovative dynamics of modern economies adding to the well-known varieties of capitalism approach.

2. The limits of the Becker's theory and the contribution of the GHM approach

The standard economic literature on new knowledge production in modern firms, for decades, has been largely dominated by the Becker's approach to human capital formation (Becker, 1962, 1975). In this theory, the main driver of a firm's productivity is the human capital of workers as it results from the employer's investment in generic and firm-specific training, which includes the time and the financial resources that the employer commits to improving workers' skills and abilities. In particular, generic training is defined as the process through which the worker develops generic competencies that may be used both in the firm where the worker is employed and in other firms. Firm-specific training, instead, is a process of learning that provides the worker with relatively more advanced and

long-term horizons (Arulampalam and Booth, 1998; Michie and Sheehan, 2003; Pieroni and Pompei, 2006; Zhou *et al.*, 2011; Giannetti and Madia, 2013; Franceschi and Mariani, 2015).

productive skills, which, however, have value only to the firm where they have been developed. By exploiting this simple distinction, Becker suggests that an employer has little incentive to provide generic training (the workers indeed may use their generic competences in other firms, which would thus free-ride), while he may have some more incentives to provide specific training, if this training can improve the productivity of the worker without the worker being able to use his specific human capital in other firms. However, under the assumption that firm-specific training is relatively more valuable but also more costly, the employer is exposed to hold-up risks to the extent that the worker may quit before the employer has been able to recoup its costly investment. As a consequence, the employer may refrain *ex-ante* from undertaking investments in specific training, in order to protect his economic interests from opportunistic actions. In this traditional approach, two elements emerge as crucial. First, there is only one specific investor, i.e. the firm-employer. The worker, here, does not bear any direct cost in the training process, while the increase in productivity due to the development of human capital is entirely rooted in the specific investment undertaken by the employer. Second, the economic problem of improving investment incentives is centred on the employer's side. In particular, it focuses on the conditions that can shift part of the costs of training to the worker (for example, by temporarily adjusting the wage below the productivity level) and that, thus, can make the employer's investment in human capital worthwhile.²

The idea that only employers undertake specific investments is, however, insufficient to properly describe contemporary knowledge-intensive firms. Innovative processes, indeed, not only require financial effort by employers but also need a significant learning effort by employees. When involved in a process of human capital development, workers are required to exert cognitive effort necessary to acquire and elaborate new information, to understand firm-specific technical problems and to learn firm-specific technologies and organizational schemes, to exchange information and to improve collaborative relationships with colleagues in order to make new knowledge production actually possible. Learning costs may also include additional working time that the employee may need to

² It is interesting to notice that, based on unilateral hold-up frameworks, several studies have analysed the effects of union power and collective worker actions on firm rents sharing pointing to a negative impact of greater employee voice on the level of investment and firm productivity (e.g., Connolly *et al.*, 1986; Addison *et al.*, 2007; Card *et al.*, 2014; Cardullo *et al.*, 2015).

spend in the firm and the possible additional working specificity deriving from the human capital development that may make the trained worker less capable to adapt his skills to other firms, thus reducing his outside options and further increasing the opportunity costs associated with his investment.³

If both the employer and the workers are specific investors, then hold-up risks emerge on both sides. On the one hand, the employer faces the risk of opportunistic actions by a trained worker, who may try to renegotiate upward his wage by threatening to quit. On the other, also the employer may play opportunistically by threatening dismissal in order to extract undue rents at the expenses of a worker who has invested in the development of the knowledge base of the firm. If the worker and the employer anticipate the hold-up of the counterpart, they both may refrain from participating to the bilateral specific investment process ex-ante.

Clearly, harmful ex-post renegotiation risks would be prevented in a world of complete contracts that specify each party's obligations in every possible state of the world. This, however, is unlikely in reality, as individuals that engage in collective human capital development, in particular in knowledge-intensive and innovative firms, are not able to foresee all possible future contingencies and contracting for details of every conceivable eventuality may be too costly. In a context of incomplete contracting, the presence of multiple specific investors changes the economic problem of the firm with respect to the traditional one-investor framework. The main issue the firm has to deal with is therefore the maximization of the overall incentives to undertake specific investments by all the parties (*in primis*, workers and employers) who contributed relation-specific resources and who thus have a "stake" that is at risk in the firm.⁴

The New Property Rights School, mainly based on the works of Grossman and Hart (1986) and Hart and Moore (1990), explains that the allocation of ownership rights (i.e. the right to make residual

³ On the economic consequences of endogenous outside options, see among others de Meza and Lockwood (2010).

⁴ The idea of firms as systems of multiple specific investments can be traced back to Aoki (1984, p. 119) who defined the firm as "an enduring combination of firm-specific resources". In his work, Aoki has analysed firms as combination of assets in which both labour and capital are specific to the production relationship and has pointed to the problem of rent-sharing and mediating interests as the main issue of a firm's governance.

management decisions and to claim the residual profits) is crucial to a firm productivity, because it can increase the incentives to invest by the owner whilst reducing those of the other specific investors who remain exposed to hold-up risks. The one who retains decisive control rights has in fact the right to decide over the use of a firm's assets, while the other parties lose the power of threatening opportunistically to withdraw some of the resources from the relationship. This increases the capability of the owner to obtain larger shares of the ex-post surplus at the expenses of the other investors and therefore improves her incentives to invest in the firm. But how should ownership rights be allocated, if multiple investors are involved, in order to maximize overall incentives and, all else being equal, to improve a firm's output? The GHM theory proposes to allocate ownership rights to the party whose investment is the most important to the firm's production activity. The idea, here, is that, in the presence of multiple players whose investments show different marginal efficiencies, a firm's surplus is improved if residual control rights are assigned to the most strategic investor. This requires, in practice, the measurement of various aspects of the investment process, including the marginal efficiency of the investments, the degree of complementarity between multiple investments and the degree to which they are relation-specific and sunk.

Using a GHM-style framework, Aghion and Tirole (1994) have analysed how different allocations of ownership rights within a knowledge-intensive firm can influence its performance in innovative activities. The focus on innovative firms has two main advantages. First, it allows developing a scheme that is coherent with the nature and activity of modern firms in technologically advanced countries, where the ability to compete in the market is strongly associated to the ability to innovate. Second, innovative activities are largely characterized by contractual incompleteness, uncertainty and inputs specificity, which make hold-up risks likely to emerge and significant. Based on the allocation of property rights on forthcoming innovations, Aghion and Tirole distinguish an integrated case, in which an employer who finances the innovation production also owns the innovation and can retain the whole surplus, from a non-integrated case, in which the employer does not retain full control rights and needs to bargain with the employee over the innovation revenues. Comparing the investment levels that may result from different distributions of control rights, Aghion and Tirole show that giving property rights to the employer is optimal when it is more important to boost the financial effort,

while giving the rights to employees is optimal when the marginal efficiency of the human capital is higher than that of the financial capital (so that it is more important to encourage the employee's working effort). This latter case, in particular, may be typical of productions on the technological frontier, in which the inventive activity of the worker is crucial to the success of innovation processes.⁵

3. The role of labour laws

In a context where multiple investors are exposed to bilateral hold-up risks, if the main issue relating the firm governance is to find the institutional mechanisms leading to higher levels of firm-specific investments, it follows that labour regulations may play a significant role, by influencing the relative abilities of workers and employers to appropriate larger shares of the ex-post surplus. Labour laws (employee representation laws and dismissal regulations, in particular) contribute in fact to specify the distribution of rights and responsibilities among different stakeholders (primarily, employees and employers) inside the firm. Therefore, they are likely to have significant effects on the behaviours of such actors both in the bargaining process through which the parties contract upon revenues sharing and, consequently, in the decision-making process through which workers and employers take their ex-ante investment decisions.

To illustrate this problem in simple terms, consider employee representation and discharge laws as two separate spheres of labour regulation and analyse their joint effects on the innovative output of a stylized knowledge-intensive firm, in which both the worker and the employer make relation-specific investments, following a simple GHM framework based on the Aghion and Tirole (1994)'s model. We

⁵ It is worth noting that the Aghion and Tirole (1994)'s conclusion is not isolated in the literature. It is reminiscent, for instance, of the argument proposed by Milgrom and Roberts (1992, p. 523) who argued that when the human capital is important and co-specialized with the other assets of the firm, then residual control rights should be assigned to workers too. Notice that also other solutions to the multi specific-investor problem have been proposed, in particular the involvement of passive third parties in the firm ownership (Rajan and Zingales, 1998) and the creation of a separate legal entity under the law acting as the repository of all the property rights (Blair and Stout, 1999). Both these latter mentioned solutions, however, are based on assigning residual decision rights to alleged independent mediating parties (shareholders and managers, respectively) which are likely to be specific investors and, as such, possibly opportunistic players. On the effect of inter-shareholder opportunism on innovative productions, see, for example, Belloc (2013).

will then discuss how and to which extent the empirical evidence may confirm the predictions of this framework.

3.1. A simple framework linking labour laws to innovation

Suppose to have a firm, composed by a worker and an employer. Suppose further that the firm is in a competitive market of goods and that its surplus depends on the quality of the product. To keep things simple, we assume that the firm produces only one good and that this good can have either a quality equal to the average quality of similar products in the market or a significantly improved quality. In this latter case, the good produced by the firm can be defined as an innovation (I) with respect to what is made available by competing firms. If an innovation is produced, then the firm obtains a larger surplus than the one associated with an average-quality product.

It can be reasonably assumed also that the production of the innovative good is a process characterized by a high level of both technological uncertainty (the inventive process conducted in the firm may not be successful and may encounter technological challenges that the firm is not able to circumvent) and economic uncertainty (even if the production process ends up with a technological innovation, such innovation may be perceived as insignificant by the potential demand in the market and the firm may not be able to mark the good up). The high levels of uncertainty make it difficult or even impossible to write complete contracts between the worker and the employer, specifying every action that they should perform in response to every possible future circumstance may arise until the production ends.

The probability that the process will succeed, however, can be raised by an increasing effort of the worker and the employer, aimed at improving the quality of the process and, therefore, the quality of the final good. In formal terms, we can thus specify the innovative good I as a probability function f increasing in both the worker's and the employer's effort (E and F , respectively), as follows:

$$I = f(E, F) \tag{1}$$

E and F can be considered as specific investments, i.e. investments that are useful to increase the value of the process in which they are developed but that are of a little utility outside that process. E is the effort exerted by the employee to develop specific competencies needed in the production process in which she is involved, to collect, elaborate and share information with the employer, to deal with technical problems and elaborate solutions to such problems and, more in general, to learn throughout the production process how to develop an innovation. F is the effort of the employer and concerns the financial contribution through which the firm can acquire tangible and intangible assets necessary to the innovative process (including the employer's resources needed to train the worker). If the firm is interested in the production of a technological innovation, both E and F should be mainly specific to their firm, as, by definition, they are implemented with the aim of providing something new that the other firms do not produce yet.

If both the worker and the employer are self-interested actors (i.e. they act by solving private utility maximization problems), we have all the elements (contract incompleteness, specific investments and self-interest) that make it possible the rise of hold-up risks.

In this context, hold-up actions may run both ways. On the one side, the worker may be tempted to hold-up the employer once the latter has undertaken his specific financial effort, in order to obtain a higher share of innovation revenues. On the other, the employer may force the worker to renegotiate ex-ante wage agreements, by threatening dismissal. If both parties anticipate the risk of ex-post opportunistic actions, they will refuse to undertake the specific investments ex-ante. To keep things simple, we can assume that the financial and the working efforts can take a high (F_H and E_H , respectively), an intermediate (F_I and E_I , respectively) or a low (F_L and E_L , respectively) level. If both parties exert high-level efforts, then the probability of innovating is maximum, while, if working and financial efforts are both low, the probability of innovating is minimum.

We now introduce binding labour laws shaping the distribution of control rights between the worker and the employer: in particular, employee representation laws influence the right to voice of the worker, whereas dismissal regulations define the firing powers of the employer. Let us emphasize

that, coherently with a traditional GHM framework, if the employer fires the worker after the latter has already undertaken her firm-specific investment, then the worker will not be able to re-employ her investments in another firm.

Having in mind a capitalist firm, that is the typical firm in western countries, where the employer owns the capital, organizes the production activities and hires the worker to run the process, we can also reasonably assume that employee representation laws, at most, allow for Nash bargaining and provide workers and employers with equal bargaining powers over revenue sharing. We do not consider institutional schemes in which the employer has no (or a relatively weak) voice in the decision-making. For the sake of simplicity, we can thus consider very weak employee representation laws (the employer retain full control rights on the business process and revenue sharing) versus very strong employee representation laws (control rights are equally divided and the worker and the employer have the same voice powers) and very weak dismissal regulations (the employer face very low firing costs) versus very stringent dismissal regulations (firing costs are very high). Four institutional frameworks, therefore, emerge.

Consider, first, a combination of strong dismissal regulation and weak employee representation laws. Under a very stringent regulation of dismissals, the employer faces very high discharge costs, which make firing virtually impossible for the employer. Here, hold-up risks for workers are prevented; in particular, the employer will be unable to force the worker to renegotiate ex-ante agreements by threatening dismissal, as dismissal is prohibitively costly. However, weak employee representation laws provide workers with little decision-making power on ex-ante bargaining over future revenue sharing. Thus, while, on the one side, ex-ante agreements will be unlikely violated by the employer, on the other, such agreements will likely be in favour of the employer who will retain all of the revenues. In this case, the employer will exert the maximum effort in production and the worker the minimum one. The resulting equilibrium will be $[F_H, E_L]$.

Where a stringent dismissal regulation is combined with strong employee representation laws, effort incentives change significantly. In this case, in fact, hold-up risks at the expenses of the worker are again prevented by the dismissal regulation; at the same time, moreover, employee representation laws give some voice power to workers. If we assume that strong employee representation laws

provide workers and employers with the same bargaining power on revenue sharing, we should observe, in this institutional framework, a relatively higher working effort and a relatively lower financial effort than those observed in the first institutional setting above considered. Indeed, the worker now anticipates that he will be able to get a quota of the innovation revenues. The resulting equilibrium now will be $[F_I, E_I]$.

Finally, consider effort incentives under a weak dismissal regulation. Here, both with weak and strong employee representation laws, the employer will have hold-up powers. Even if the worker has the possibility to participate to the ex-ante decision-making process over future revenues sharing, the shareholder has the incentive to violate such agreements in order to extract undue rents at the expenses of the worker, thanks to the very weak dismissal regulation that allows costless firing. In this case, on the one side, the employer will exert a maximum financial effort (she will be able, indeed, to retain all of the innovation revenues), while, on the other, the employee will not have any incentive to exert effort above the minimum contractible level. The resulting equilibrium will be the same as in the first case, that is $[F_H, E_L]$.

Summing up, investment decisions are $[F_I, E_I]$ when dismissal and employee representation regulations are both very strong and $[F_H, E_L]$ under any other institutional setting.

Being $F_I < F_H$ and $E_I > E_L$, the relevant question is: which is the regulatory framework that maximizes a firm's overall innovation incentives? Phrased differently, from an aggregate point of view: which one is the framework that, all else being equal, can best contribute to improve innovation performance of an economic system?

To answer this question, we need to recall the innovation function (1) and discuss how it is likely to be characterized. In principle, function (1) can take rather different forms. For example, working effort and financial effort may be substitute, that implies, in very simple terms, $I = aE + bF$, where a and b are labour and capital coefficients, respectively. In this case, an increase in working effort may not be sufficient to compensate a reduction in financial capital to the extent that $a < b$, with the consequence that the innovation probability will be maximized under the $[F_H, E_L]$ equilibrium rather than under $[F_I, E_I]$. Where $a > b$, instead, $[F_H, E_L]$ will be associated to lower innovation performance. An innovation

process with substitutable inputs, however, is quite unlikely. This would indeed imply that workers can substitute capital until it is completely replaced, or vice-versa, and that the production would anyway take place without one of the two inputs. More likely, working and financial efforts are to some extent complementary. In this latter case, we may have an innovation function of the form: $I = E^a \cdot F^b$. Where labour and capital are complementary, the production process cannot take place without one of the inputs and both inputs are necessary to have non-zero innovation probabilities. In particular, if the input coefficients a and b have a similar value, then the innovation probability will be higher when both working and financial efforts are at an intermediate level (i.e. $[F_I, E_I]$) than when financial effort is very high and working effort very low (i.e. $[F_H, E_L]$). This is true to a larger extent in knowledge intensive productions, where human capital is largely proved to be crucial for innovation activities and where, therefore, the coefficient that links the working effort to a firm's innovation performance is relatively large.

The innovation function (1) may take, of course, much more complex forms. Moreover, working effort and financial effort may react to the different institutional settings here considered in various ways, difficult to identify and even more to be precisely formalized. Reputational concerns in repeated interactions, in addition, may strongly influence commitment and hold-up risks. However, the simple framework above presented allows us to make some reasonable predictions that are worth emphasizing. Firstly, the economic effects of a change in employee representation regulation are likely to depend on the existing framework of dismissal regulation. Specifically, a very weak protection of employees against unjust firing may hamper the working incentive effects of an increase in representation rights, to the extent that the employer retains full hold-up powers and can therefore neutralize workers' voice. Secondly, at least in knowledge-intensive innovative sectors, we should observe that stronger employee representation regulations may positively influence overall innovation performance of firms in institutional frameworks characterized by relatively stringent dismissal laws.

Although here we have proposed a micro-founded simple scheme that focuses on a stylized firm and although different firms may actually show different behaviours, from an aggregate point of view, if our intuitions are correct, on average, institutional schemes combining strong representation rights

and strong firing protection should over-perform with respect to less binding labour law systems, in particular in technologically advanced economies employing massive levels of firm-specific human capital in production.

3.2. Some preliminary evidence

The assessment of the relationship between employee representation rights, dismissal regulations and innovation requires to link country level laws with aggregate firm level outputs. A first attempt to measure this relationship may thus be obtained by comparing the level of protection of workers' interests, as it is shaped by national employee representation and dismissal laws, with a measure of the innovative performance of firms, which can be obtained by aggregating data on successful patent applications at a country level.

Figure 1 shows a descriptive evidence of this relationship, obtained by using data on five countries over the 1977-2005 period. The vertical axis measures the yearly number of EPO patents of the business sector, at a country level and weighted by the population (in order to make valid comparisons between countries of a different size). The horizontal axis measures the strictness of an index of employee representation laws, calculated by Deakin *et al.* (2007) as an average of seven sub-indicators covering unionization rights, collective bargaining rights and extension of collective agreements, co-decision making powers and other dimensions covered by representation rules. This index ranges from 0 (minimum worker protection) to 1 (maximum protection). Each point in the Figure represents country-year values of both innovation output and employee representation laws level. As it can be noticed, in the Figure two sets of observations are distinguished, according to the degree of legal employee protection against dismissal. In particular, country-year observations have been divided in two sub-groups of equal size, where the first group (light grey colour) is the set of observations with a relatively weak regulation of dismissal (below the median value of the sample), while the second group (darker colour) is the set of observations with a relatively strong regulation of dismissal (above the median value of the sample). Specifically, the dismissal regulation index (again, provided by Deakin *et al.* (2007)) is constructed by combining a set of sub-indicators on legally

mandated notice period and redundancy compensation, remedies for unjust dismissal and other constraints on dismissal. Also this index ranges from 0 (minimum worker protection) to 1 (maximum protection).

[insert Figure 1 about here]

What is interesting to observe is that the relationship between greater employee representation rights and aggregate innovation performance of firms is, on average, positive. However, while the linear fit describing this relationship is relatively flat under weaker dismissal regulations, it becomes much sharper in legal systems with stronger worker firing protection. The message of this Figure is that the descriptive evidence may actually sustain the argument according to which institutional schemes combining strong representation rights and strong dismissal protection should over-perform with respect to less binding labour law systems in terms of specific investment capabilities and innovative outputs.

Of course, to address the causality forces that may be behind this empirical relationship is a much more challenging issue and econometric conclusive answers are still missing. However, distinct empirical works focusing on several aspects covered by employee representation regulations seem suggesting that an increase in worker participation rights under the law may positively influence investment performance and innovative output of knowledge-intensive firms. An heterogeneous empirical literature finds, in particular, improved innovation activity in those firms assigning larger control rights to workers in various forms, including delegation and decentralization of decision-making in team-based organizational structures through human resource management practices (e.g., Scott and Bruce (1994), Laursen and Foss (2003)), employee legal ownership of a firm's capital and physical assets (Smith, 1994), larger unionisation (see, among others, Machin and Wadhvani (1991)) and board membership (Kraft *et al.*, 2011).

Taken together, these works would suggest that stronger employee representation rights may significantly stimulate employees' specific investments and working effort. Future empirical legal

research should try to more deeply understand to which extent representation regulations can actually sustain overall innovative performance of firms and countries and how their effect may depend on complementary labour policies concerning dismissal regimes.⁶

From a policy perspective, future research may also consider to which extent dismissal regulation and representation regulation can be integrated in legal systems bringing firing decisions under the scope of worker participation institutions, as in the German *Mitbestimmung* (see Addison (2009) for a general overview). In the discussion presented here we have considered dismissal regulation and representation legislation as two distinct spheres of labour law. However, they may overlap and may provide, if combined, multi-party governance in which control rights of workers can alter the costs of (or even impede) the exit option of employers. Thus, in this view, mechanisms of co-determined governance and mandatory dismissal regulation under the law may also be partially substitute.

4. Another look at the varieties of capitalism?

In conclusion, it is useful to consider the interesting implications that may derive from integrating the so-called “varieties of capitalism” (VoC) approach (originally introduced by Soskice (1997) and Hall and Soskice (2001)) with the GHM-style framework linking labour laws to innovation.

In a comparative institutional perspective, the VoC literature analyses the link between national patterns of corporate governance and national patterns of corporate innovation. This approach distinguishes, in particular, market-based and non-market modes of coordination between economic corporate actors. Liberal market economies (typical examples include the USA, the United Kingdom and other Anglo-Saxon countries) rely heavily on market relations to resolve coordination problems. In this type of systems, regulatory regimes, both in the labour and the financial market, are more tolerant of asset mobility. Capital markets tend to be deregulated and relatively liquid, while labour markets are characterized by low-cost hiring and firing and relatively flexible reward-settings. By contrast, coordinated market economies (typical of Germany, some continental European countries and Japan) rely on more stringent securities regulations, stronger labour unions, cross-shareholdings

⁶ Some tentative results are provided in Belloc (2015).

and reputational linkages both in the capital and the labour market. Following this simple classification, Hall and Soskice (2001) have shown that liberal market economies should be better at supporting radical innovation, which includes those technological developments requiring low asset specificity (this is the case of pharmaceuticals and biotechnology, among others), while coordinated economies should facilitate the development of incremental innovations, typically based on the use of firm-specific assets.

A crucial element of the VoC argument is the link between institutional and inputs complementarities (see Hall and Gingerich (2009)). Only where physical capital and human capital are both specific (such as in incremental innovation environments) regulatory regimes are required to sustain their long-term commitment in the firm through stringent financial and labour regulations. From a policy point of view, this conclusion may implicitly sustain the idea that relatively stronger labour laws should be expected to positively impact on innovative corporate performances only where complementary institutions in the financial market are also established. Accordingly, liberal market economies should not significantly benefit from greater labour protection.

If we introduce some of the GHM intuitions in the original VoC approach, new policy options may usefully emerge. According to the simple framework presented in this Chapter, what determines a positive effect of stronger workers' control rights on innovation output is the relatively higher importance (not only in terms of specificity, but also of essentiality and marginal efficiency) of the human capital with respect to the financial capital, where the latter does not need to be specific or crucial to the production. More precisely, in a GHM framework, the more generic the financial capital is, the stronger control rights of employees should be. Therefore, it is possible to argue that also sectors traditionally identified with a radical innovation model (and, consequently, economies more largely specialized in such sectors) may benefit from improved employee control rights, to the extent that the human capital shows a relatively high intensity.⁷

While the VoC literature seems to exclude significant positive effects from the implementation of relatively stringent labour laws (combining strong employee representation regulation, i.e. voice

⁷ An interesting example is the case of pharmaceuticals, which is both an intensively radical innovation sector (according to the classification proposed by Griffith and Macartney (2014)) and one of the most human-skill intensive industries (according to the Ciccone and Papaioannu's (2009) index of human capital intensity).

rights, and dismissal regulation, i.e. hold-up legal protection) in liberal market economies, a property rights approach leaves room for exploration and implementation of labour policies that may reconcile a partial reallocation of control rights to workers and improved technological development also in radical innovation sectors.

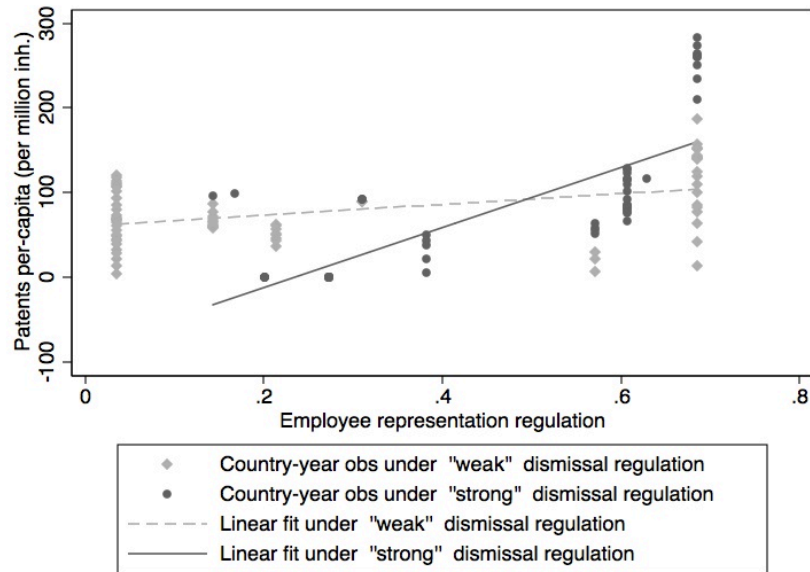
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Figure 1



Note: Innovation data measure yearly manufacturing patents filed at the EPO calculated as the number of business sector patents per-capita (per million inhabitants) and are obtained from Eurostat (2014). Employee representation regulation and dismissal regulation data are calculated as synthetic indexes ranging from 0 (min worker protection) to 1 (max worker protection) and are obtained from Deakin *et al.* (2007). Both innovation and labour laws data are at a country-year level, covering France, Germany, India, UK and USA, over the period from 1977 to 2005. “Weak” dismissal regulation refers to index’s levels below the average value of the sample; “strong” dismissal regulation refers to index’s levels above the average value of the sample.