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Marianna Belloc

Ugo Pagano

Politics-Business Interaction Paths

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Marianna Belloc and Ugo Pagano[♦]

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Abstract

Countries characterized by strong workers' political rights tend to exhibit a strong and concentrated corporate ownership structure. One explanation is that employees political rights influence corporate governance: systems characterised by strong employees rights tend to be balanced by strong and concentrated owners. In this approach, the separation between ownership and control is only possible when unions and social democratic parties are sufficiently weak. In this paper we argue that causation runs also in the opposite direction (from strong concentrated ownership to strong employees protection) and leads to multiple equilibria characterized by alternative interaction paths of Politics and Corporate Governance. To empirically assess our theoretical arguments, we run Bayesian simultaneous equation estimation and perform Bayesian model comparison of the various theories for employment protection determination. We obtain that the concentration model is more likely than other models in the determination of employment protection. We conclude by exploring economic policy implications.

Keywords: employment protection, corporate governance, ownership concentration, Bayesian model estimation, Bayesian model comparison.

JEL Classifications: G32, G34, J50, K22, P10

[♦] Marianna Belloc: Department of Economics, Sapienza University of Rome (marianna.belloc@uniroma1.it). Ugo Pagano: Department of Economics, University of Siena, and Central European University, Budapest (pagano@unisi.it).

1. Introduction

Similarly to the earlier successes of Japan and Germany, the recent success of the American economy and the revival of the British economy have attracted the attention of many economists and policy makers[1]. The legal origin approach has emphasized how the recent success may have very old roots in the different common law and civil law traditions, which, well before the advent of capitalism, characterized these countries. Under common law systems, private owners, including the minority shareholders of contemporary large firms, could be better protected. Other approaches have emphasized how the non-proportional electoral systems, prevailing in the Anglo-American world, favors political coalitions which are more friendly to shareholders.

Since a long time, "American exceptionalism" has been a puzzle for social scientists but the nature of the problem has somehow changed. Becht and De Long (2005) have observed how a century ago academics like Werner Sombart worried why the United States was exceptional in that it did not have socialism, while today academics worry about a different form of American exceptionalism: the negligible role of block holding in the United States.

Mark Roe has linked together these two different pieces of the American puzzle observing that, in modern capitalist economies there is a causal relation running from social democracy to corporate governance. According to Roe (2003) the higher the degree of social democracy (and, in particular, the strength of employees' rights) the stronger the employers tendency to organize in concentrated forms of corporate ownership with one or few major block holders. Figure 1 plots residuals obtained from the regression of the labour protection index and of the ownership concentration index over GDP per capita for 21 OECD countries[2]. As it is apparent from the fitted regression line, there is a significant positive cross-country correlation between the degree of protection of workers' rights and the degree of corporate ownership concentration (once considered the cross-country differences in GDP per capita). According to this figure, American exceptionalism can be seen as an extreme case of a general relation linking together employees job protection to the degree of separation between ownership and control (see Belloc and Pagano, 2005). This evidence is also confirmed if we extend the sample considered to include 47 countries (Figure 2)[3]. To explain the positive relation between protection

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[1] Hansmann and Kraakman (2004) have even seen the convergence to the Anglo-American model as the "end of history of corporate governance". Other authors (see, for instance, Morck et al., 2005, and James, 2006) have argued that a variety of arrangements exists in modern capitalist economies and family groups are the prevailing form of organization in some countries. Bebchuk and Roe (2004) have emphasized the path-dependent nature of corporate governance.

[2] See paragraph 3.3 for a more detailed variables' description (data source for the labour protection index is Nicoletti and Scarpetta, 2001; GDP per capita in 2000 is from World Bank, 2004; ownership concentration index is from La Porta et al., 2006).

[3] Data source for the labour protection index (which includes protection of labour and employment laws plus protection of collective relations laws) is Botero et al. (2004).
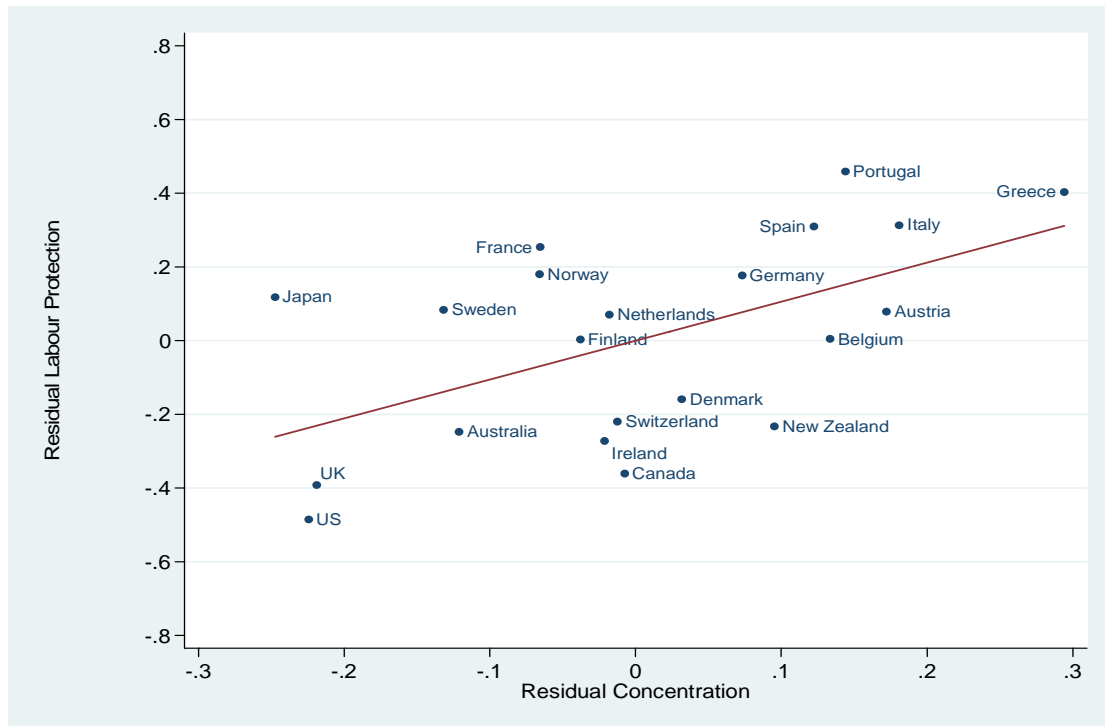
Figure 1. Partial regression plot of labour protection index and ownership concentration (21 OECD countries). Coef. = 1.0577 (p-value = 0.007).

of workers' rights and corporate ownership concentration, Roe (2003) suggests a causality relation that runs from employees political rights to corporate governance forms. In Roe's approach, the separation of ownership and control is not due to "better" corporate laws, stemming from different legal origins (La Porta et al., 1998, 1999), nor to different electoral processes, leading to a better protection of minority shareholders (Pagano and Volpin, 2005). It is rather inversely proportional to the degree of "social democratic" political pressure and, in particular, to forms of job protection. When this pressure is present, strong and active owners are necessary to limit managers tendency to collude with employees. In this case, by resisting this pressure, big block holders would provide a public service also for the small share holders.

In this paper we extend Roe's approach by integrating it with the opposite direction of causation running from ownership concentration and business organization to employees rights and stronger job protection. When there is no separation between ownership and control, employees are more likely to seek protection from the interference of the dominant block holders and their social circle, including their relatives and friends, who may otherwise monopolize the best jobs of the company. Thus, while employees rights may prevent the separation between ownership and control, conversely the existence of powerful block holders may favour some sort of "social democratic reaction" and, in particular, a high degree of unions activity. This two-way relationship entails multiple co-evolution paths between
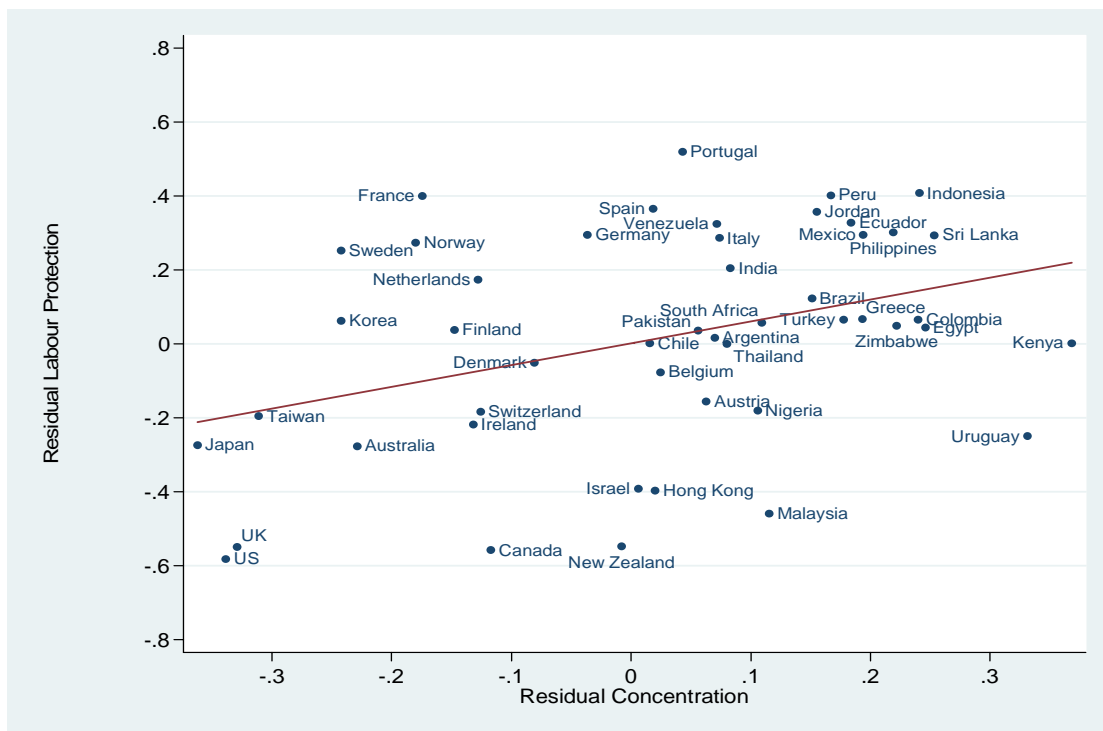
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Figure 2. Partial regression plot of labour protection index and ownership concentration (47 countries). Coef. = 0.5916 (p-value = 0.006).

ownership concentration and workers' organization: a certain degree of centralization of the interests of one side may easily induce a corresponding concentration of the interests of the other side. The previous literature has already been devoted to explore the determinants of workers' rights protection and of ownership concentration. As already mentioned, a considerable part of it advocates the role of laws. Botero et al. (2004) implement a comparative study of the various models that try to explain the regulation of labour. The authors compare three broad theories: (*i*) the *efficiency theory* (North, 1981; Demsetz, 1967) maintains that governments select labour market interventions to cure market failures so to maximize social welfare; accordingly richer countries are expected to regulate less as they have fewer market failures to heal; (*ii*) the *political power theory* (Olson, 1965, 1993) argues that institutions transfer resources to individuals that are endowed with political power; accordingly workers rights are expected to be protected by stricter regulation when the government has a leftist orientation; (*iii*) finally, the *legal theory* (La Porta et al., 1998, 1999; Djankov et al., 2003) sustains that institutions are shaped by the legal tradition that characterizes the various countries: Common law economies are expected to regulate the least, and French law countries the most. While the authors find empirical support to the latter two theories (but not to the former), they also discover that the estimated impact of legal origins on labour regulations is larger than that of politics.

On the other side, La Porta et al. (1999) analyze the role of legal traditions in explaining cross-country variation in ownership concentration. Starting from a sample of 27 wealthy economies, the authors classify them in two groups with respectively high and low

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degree of shareholders' protection. They observe that widely held firms are more common in the former group of countries, while family-controlled and state-controlled firms are more numerous in the latter. Moreover, the first subsample is dominated by British law economies, whereas the second one by French law countries. La Porta et al. (2006) further investigate the determinants of stock market development in 49 economies focusing this time on securities laws. The authors argue that "laws matter" by improving market discipline. In particular, they show that laws imposing mandatory disclosure of relevant information and those specifying liability standards have a positive and statistically significant impact on stock market development.

Legal theories compete with political power theories. Pagano and Volpin (2005) evaluate the simultaneous determination of shareholder and employment protection, stressing the role played by the proportionality of the voting system. The simultaneous equations model estimation for a sample of 21 countries suggests that the proportionality of the voting system exerts a negative and statistically significant effect on shareholder protection, while has a positive (but not always significant) impact on employment protection legislation. Panel data analysis (which however does not considers simultaneous determination of the two dependent variables) confirms these conclusions and also corroborates the important role played by legal origins in the determination of the two variables.

Finally, Roe (2003) presents overwhelming evidence that countries characterized by stronger job protection and employees political rights (stronger "social democracy") tend to have more concentrated corporate ownership forms. The causality relation is, however, not tested by the author. In a similar vein, Mueller and Philippon (2006) maintain that (family) concentrated ownership is relatively more common in countries where labour relations are hostile, while dispersed ownership is prevalent in countries characterized by cooperative labour relations. They also offer coherent empirical evidence using survey-based measures of the quality of labour relations and ownership structures data for 30 countries.

In this paper we try to show that our *Politics-Business Co-evolution* hypothesis explains better than other theories the variety of business and workers organizations that characterizes modern capitalist economies. In the next section, we consider in detail the theoretical and historical argument which support our hypothesis while in section 3 we adopt Bayesian estimation and Bayesian model comparison to show that our approach offers an explanation that is more likely than those existing in the literature. Finally, in the last section, we consider the policy implications of our analysis.

2. Dispersed and concentrated interaction paths.

In his book "Strong Managers, Weak Owners" Mark Roe (1994, p. 4) observed how, in spite of all the shortcomings which are today in the spotlight, the separation of ownership and control allowed skilled managers to run the firm and separates unskilled descendants

from control of the firm they could not run well. In a similar vein, Chandler (1990) contrasted American and German managerial firms with British family firms at the time of the second industrial revolution, and argued that family control was the cause of the poor performance of England.

Managerial hierarchies do not simply imply the usual problem that interests of the managers should be made consistent with those of the shareholders but also a broader and, somehow, opposite problem: that the "family allocation of control" does not interfere with the internal meritocracy of the firm and the incentives for good managerial performance. In spite of the well-known agency problems, the separation between ownership and control had positive effects because it increased the role of competence allocation rules over that of family connection rules.

The US were ideally suited to develop the meritocratic institutions necessary to the working of managerial hierarchies. They lacked the sense of class divisions that underlined the dynastic assignment of many jobs in Europe. The weakness of American "social democracy" was somehow related to the widespread feeling that class extraction was not an insurmountable barrier for the achievement of economic power and, consequently, there was no strong need to organize unions and other institutions which could tame the economic power of established capitalist dynasties. The US were typically characterised by politicians, who acted on the basis of the belief that a full-blown democracy (as well as their own "democratic power") was incompatible with a concentration of economic power. In this respect, a single cultural and political tradition linked together Jefferson s vision of a democracy based on small land owners, Jackson s confrontation with the power of the Bank of America and Lincon s successful war against the slave owning aristocracy of the South (Hofstadter, 1967). At the beginning of the second half of the nineteenth century the US was the only country (maybe together with Switzerland[4]) where the landed aristocracy had no important cultural and political role in social life. Thanks to their anti-aristocratic attitude, the US had an early reaction 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

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[4] There are remarkable similarities between US and Switzerland historical backgrounds. Both countries are somehow geographically protected by foreign powers, respectively by the Oceans and the Mountains, and internally geographically divided by long distances (the US) and by the high altitudes of the Alps (Switzerland) - a geography that has favoured decentralized federalist arrangements in the two countries. Both countries came to an early tolerance of religious and ethnic diversity and the "cement of society" relied more on shared values and ways of life than on ethnic or religious homogeneity. Also Switzerland achieved an early exit from feudal relations. Swiss feudal ties were traditionally weak. The peasants were difficult to dominate because they were often far away on the Alpine pastures and because they were well trained in military activities (serving, often, as the most valuable mercenaries all around Europe). After the defeat of the *Sonderbund* alliance, formed in 1847 by the conservative and Catholic Cantons, the "Swiss Confederation or, more accurately, some twenty-three leading figures in it, drafted a document so suited to the conditions that the Switzerland of 1849 and of 1847 seem to belong to different eras (Steinberg 1996, p. 47). Similarly to the US (where the secession war 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.

Theodore Roosevelt s confrontations with big business, Wilson continued to try to set limits to the power of the major block holders. During his presidency, the Clayton act (1914) ruled that the ownership of substantial stakes in different firms could induce self-dealing and unfair competition and should involve the action of anti-trust authorities. F.D. Roosevelt completed these policies by using taxation to dismantle the pyramids (Randall, 2004) that, in many cases, had allowed few "economic royalists" to use "other people's money" to impose a "new industrial dictatorship" (Roosevelt quoted by Roe, 1994, p. 40). While the American absence of social-democratic job protection, allowed a radical diversification of asset ownership and a transfer of power from owners to managers, also the reverse was happening: social democratic job protection became weaker because early restrictions were imposed on block holders and made it more difficult to gain private benefits from partial, but substantial, ownership. Early democratic policies induced dispersed forms of ownership and a separation between ownership and control. This "exceptional" early dispersion of capitalist interests made it less important to concentrate workers' interests in strong unions and in social democratic parties. The two sides of American "exceptionalism" reinforced each other: there was little socialism because block holding was inhibited and there was little block holding because a socialist movement of European dimension and radicalism did not develop.

The two-way causation between politics and business is also evident in those countries where there were relevant class barriers and dynastic policies played an explicit role in both the political and economic sphere. This typology included England, where the landed aristocracy had transformed itself into an entrepreneurial class and led a revolution against the powers of the crown. It comprised also cases, such as France, where the aristocracy had resisted revolutionary forces with alternative fortunes or, even more problematic cases like Germany, where the emerging bourgeoisie could acquire legitimacy only by imitating the customs and the dynastic ambitions of the Junkers (see Moore, 1973). In these economies, owing family dynasties exercised a power upsetting the values of managerial meritocracy (Morck, 2005 and 2006). Wealth, family connections, proper accents, social skills and even appropriate table manners interfered with an assignment of jobs based on effort and competence. In these circumstances, social-democratic movements could easily emerge as spontaneous reactions to the privileges of the ruling dynasties and be reinforced by the widespread feeling that the "have-nots" had to be defended against the exercise, and often against the abuse, of economic power. Faced with the concentration the power of the wealthy, "social democracy" could only limit and, sometimes, challenge its exercise by organizing a countervailing power. While "social democracy" could scare owners and make it impossible the separation of ownership and control, the identification of ownership and control created the conditions for all sorts of "social-democratic" reactions, including unionization and development of job protection.

Dispersed ownership and low degree of "social democracy" can be seen as institutional complements. Similarly, concentrated ownership and high degree of "social democracy", can also be seen as institutional complements. One way of explaining these relations of

complementarity is in terms of reciprocal disarmament and armament[5]. Each group can achieve a higher capacity of exercising power by concentrating dispersed interests in centralized agents which can better solve free-riding problems (Olson, 1965). Like in an arms race game, all level of armaments can potentially be equilibria and define different countervailing balances of power (see Pagano and Belloc, 2005). For instance, the balance of power can stay the same if both owners and workers stay dispersed or if both are concentrated defining the two following possible extreme equilibria, which approximate the US and the countries clustered at the south-west corner of Figure 1 and Figure 2. The self-reinforcing interactions between dispersed ownership and labour interests generate a *dispersed equilibrium* and, similarly, the self-reinforcing interactions between concentrated ownership and centrally organized workers interests generate a *concentrated equilibrium.*

In the extreme as well as the intermediate cases, the incentive to concentrate interests of one side increases with the concentration of interests of the other side or, in other words, the (dis)armament of one party favours the dis(armament) of the other. However, there are limits to this symmetric representation of the concentration and dispersion of owners and workers interests. The ownership of capital can be concentrated, by the means of ordinary market transactions, in the hands of few owners and there will be a spontaneous tendency to do so whenever it increases profits. By contrast, because of non-slavery and self-ownership, the property of labour is necessarily dispersed and the concentration of labour cannot be achieved by the means of standard economic contracts. In this case, politics can be used to stop the concentration of capital or to further the concentration of labour interests in trade unions.

Since market forces tend to concentrate capital and to disperse labour, in absence of an early and strong policy, a concentrated equilibrium is likely to arise: the "political" organization and concentration of workers interests follows the spontaneous "economic" concentration of capitalist ownership. When politics is anticipated by spontaneous capitalist concentration, it reacts to it by favouring a comparable concentration of interests on the workers' side. Some degree of social democracy or other arrangements restoring the balance of power between the two parties is then likely to arise in a democratic society.

The historical conditions under which a *dispersed equilibrium* is likely to arise are rather special and, perhaps, they were approximated only by the US. When the need for large scale companies came about, no other country (with the possible exception of Switzerland) had so many citizens who had come from a massive and, sometimes, conscious exit from dynastic feudal relations. Many of them had been in search of religious freedom. Moreover, by revolting against the British colonial rule, their ancestors had also broken with the deference to established family dynasties. Only in America such a strong ideology against "economic royalists" and "industrial dictatorship" (Roosevelt quoted by Roe, 1994, p. 40) pre-existed the age of large scale capitalist firms. Some key elements of this ideology were the distaste for the type of concentrated dynastic interests characterising the old

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[5] See also Topkins (1998), and Milgrom and Roberts (1994).

continent. Social respect moved from people born wealthy to "self-made" individuals. Thus, the meritocratic climbing of a corporate managerial ladder was far more compatible with American ideology than the deferential respect for the concentrated power of the capitalist dynasties. Managers did not need to plot against concentrated owners. They were the unintended beneficiaries of a political struggle against concentrated interests (Roe, 1994). The public company ruled by managers was itself the unintended outcome of this struggle and prevailed because its internal promotion system fitted better the American political conditions and, more generally, the American way of life than dynastic succession. The very special conditions of American history allowed American politics to anticipate the concentration of the owners interests in the way predicted by our politics-business co-evolution hypotesis: in a case, approximated by a *dispersed equilibrium*, causation was initially moving from politics to forms of business organization.

The historical conditions necessary for a *concentrated equilibrium* are quite common. In many other countries, some form of concentration of ownership interests went together with the growth of large-scale enterprises, and family dynasties were usually involved in the management of firms and in the appointment of managers. In many cases, financial institutions made the exercise of this power compatible with the needs of large-scale enterprises by putting in the hands of the "economic royalists" the availability of "other people's money". The limited diversification of risks and the poor incentives for professional managers were (partially) compensated by the capture of many important management jobs by the ruling families and by a decrease of the agency problems arising from the separation between ownership and control. The inability of politics to anticipate the "armament of capitalism" induced later a political reaction to arm labour by concentrating and organising its interests. Since, in most countries, politics could not limit the concentration of the ownership interests, the resulting model of corporate governance caused a "social democratic" political reaction. Thus, in most European countries the direction of causation is consistent with the general prediction concerning the achievement of *concentrated equilibria*: politics reacted only lately to a model of corporate governance serving the concentrated interests of capitalist dynasties.

Since each type of institutional equilibrium (concentrated or dispersed) tends to show a remarkable degree of stability, the "political origins" of corporate governance - that is the political conditions existing when big capitalist firms first emerged - are quite important and, in many cases, they have even shaped in an irreversible way the co-evolution paths between politics and corporate governance. However, in some cases, some economic and political processes have moved the economy from one co-evolution path to the other and, during the transition, the organization of corporate governance and labour market institutions were mismatched.

The UK is a particularly interesting case because it has gone through a long period of institutional mismatch. It has gone through a difficult transition from a politics-business co-evolution path based on well-established family dynasties and well-organized trade-unions to a model of "popular capitalism" based on dispersed ownership and weaker unions. In the

UK an open aristocracy led the revolt against the King and mutated into an entrepreneurial class. Some form of aristocratic family capitalism had an important role in the first, and mainly British, industrial revolution and preserved its dynastic power at the time of the second industrial revolution. However, at that time, according to Chandler (1990), this typology of capitalism was outdated. The new industries, which developed in the second half of the nineteenth century required some form of managerial capitalism. According to him, this explains the relative decadence of British Capitalism at the time of the second industrial revolution.

Early unionization and a deep sense of class division made Britain a case close to the case of *concentrated equilibrium*. However, some forces would slowly produce a substantial mutation in the characteristics of British capitalism. Transmission and division of inheritance, coupled with the international role of the city, produced a dispersion of property. For some time, the fragmentation of firms ownership did not involve a comparable loss of centralized control, which remained entrenched in the usual social and family circles. Indeed, in the seventies the UK was characterized by a situation of "institutional disequilibrium" where the traditionally well-organized British unions were not matched by a countervailing centralization of firms ownership. This period coincided with a crisis of the British economy - which, for some times, seemed to lead to "continental solutions" such as pyramids and cross-share holding on one side and some "responsible" centralization of union s activity on the other (Franks, Mayer and Rossi, 2005). These "continental solutions" were, however, opposed by the city. Eventually the Thatcher government made a sharp move towards a *dispersed* type of institutional equilibrium characterised by strong limitations of unions activities and by a (much advertised) shareholder popular capitalism. These arrangements have not been substantially reversed by the subsequent Labour Party governments.

The UK transition shows how the "political origins" of a certain country have a long-lasting but not a definitive influence on the characteristics of its economic system. They can be eventually reversed by some combination of spontaneous economic processes and of conscious government s policies. One cannot only rely on the alleged permanent effects of "exogenous" origins and should really focus on the multiple paths of interaction between politics and business. Some co-evolution paths may be upset by sudden shocks and by slow cumulative changes. For limited periods of their histories, some countries may experience painful transitions from one path to another and be out of any sort of "institutional equilibrium". However, if, in the long run, these co-evolution paths work as "institutional attractors", for a sufficient large number of countries, relations such as considered in Figure 1 should fit. In this sense, our co-evolution hypothesis is intended to explain the characteristics of alternative systems of corporate governance.

In the next section, we will concentrate on the quantitative analysis of our politics-business co-evolution paths. However, we will mention immediately some qualitative historical evidence, which, in our view, makes our hypothesis preferable to alternative explanations. In particular we wish to argue that, in spite of the limitations of (perhaps all)

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origins-type explanations, the *political origins* of big business explain the various models of corporate governance better than *legal origins.*

According to legal origins, "common law systems" explain the emergence of public companies. This theory puts under the same umbrella the US and the UK- an explanation that does not fit with the fact that the UK had "continental features" and it could easily ended up being completely "continental". British institutions have moved closer to the US only thanks to the (relatively recent) strong policies of Margaret Thatcher.

Moreover, the Politics-Business Equilibria hypothesis is consistent with the case of Switzerland, which poses a rather difficult puzzle for the legal origins story. In terms of legal systems Switzerland is clearly part of the continental traditions and it is difficult to attribute the dispersed nature of ownership of its large firms to different legal origins. By contrast, Switzerland fits very well our Politics-Business co-evolution hypothesis. Switzerland is the only European country that, by the time of the second industrial revolution where, similarly to the US, the political role of the landed aristocracy had vanished and which (again similarly to the US) was characterised by an early democratic federal political system with little sense of continental class divisions. Well before England, most Swiss Cantons could realize the political conditions for a "dispersed equilibrium" and fit the south-west corner of Figure 1 and Figure 2.

A similar "historical" objection could be raised with reference to theories that link corporate governance with political electoral systems. With the same electoral system, Britain moved from family capitalism to more managerial forms of corporate governance and, with some complicated, often proportional, electoral rules, Switzerland had a co-evolution path relatively close to the US.

While we have exposed this qualitative evidence in favour of our hypothesis, we are well aware of the fact that each model and each explanation can have its exceptions and shortcomings. One cannot rely only on arguments which focus on "case studies" concerning particular historical paths. For this reason, in the next section we will consider a numerous sample of countries and we will try to argue that our politics-business interaction hypothesis, relatively to other explanations, has better chances to explain the different forms of corporate governance and of labour protection.

3. Comparing models: a Bayesian approach

3.1 *Motivation*

In this section, we carry out an econometric analysis to gauge the two-way relationship between corporate governance forms (*Business*) and degree of workers' rights protection

(*Politics*), using a cross-section of 47 economies[6]. We adopt a Bayesian perspective in estimation and model comparison. We believe this is the relevant methodology in our context for the following reasons. First, as mentioned in the introduction, several recent studies have offered data evidence on alternative explanations for employment protection, on the one side (Botero et al. 2004; Pagano and Volpin, 2005), and for corporate governance, on the other (Pagano and Volpin, 2005; La Porta et al. 1998, 1999, 2006; Mueller and Philippon, 2006; Roe, 2003). It follows that, if we purport to study the (co-)determination of employment protection and ownership concentration without resorting to an arbitrary variable selection procedure, we need to control for a long list of regressors. Thus, when an unquestioned structural theoretical model is not available (as in our case), model uncertainty is crucial. What is relevant in this context is investigating the relative importance of one model relatively to another considering all the models that cannot be rejected by the data. The Bayesian methodology allows to explicitly take into account model uncertainty when implementing model comparisons. Second, we choose Bayesian econometrics because of small sample data limitations. As it is frequent in cross-country analyses, our sample is small (47 data points). In the presence of few observations, empirical distributions do not proxy limiting distributions. Furthermore, as shown by James and Stein (1960) and Efron and Morris (1971, 1972) when the number of parameters is large with respect to the number of observations, Bayesian approaches are superior in terms of parameter estimates to frequentist approaches (Gelman and Rubin, 1995). If prior information on the parameters of interest is available, it can then be used to select the list of regressors to include into the model, and to assign prior distributions to the corresponding parameters that represent basis for inference.

We therefore consider a simultaneous two-equation model for labour protection-and-ownership concentration determination taking into account the various theories proposed by the previous literature (legal, political, and efficiency theories) as well as our *Politics-Business interaction* argument. The full model is estimated employing Bayesian estimation and, finally, the various theories are compared by Bayesian nested and non-nested model comparison. Before presenting the model and the data (subsection 3.3), in the following subsection we briefly review the econometric approach adopted (for a more detailed textbook treatment see, for instance, Koop, 2003, which we rely on in our exposition below). Subsections 3.4 and 3.5 present our results.

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[6] Countries included in the sample are: Argentina, Australia, Austria, Belgium, Brazil, Canada, Chile, Colombia, Denmark, Ecuador, Egypt, Finland, France, Germany, Greece, India, Indonesia, Ireland, Israel, Italy, Japan, Jordan, Kenya, Korea, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Pakistan, Peru, Philippines, Portugal, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Thailand, Turkey, UK, US, Uruguay, Venezuela, Zimbabwe.

3.2 *Methodology*

Bayesian estimation is implemented by combining data likelihood with prior information to compute the posterior densities (Zellner, 1971). According to this approach all uncertainty (about the model, about variables' selection, and about the unknown parameters) is expressed in terms of probability distributions, and relies on few simple rules of the probability theory. More precisely, imagine we have a matrix of data $Y = [y, x]$ and a vector of parameters $\theta = [\theta_1, \theta_2, ..\theta_k, ...]$, and wish to learn about the parameters θ given the data Y. Bayes' theorem can then be applied, which states that:

$$p(\theta \mid Y) = \frac{p(Y \mid \theta) \times p(\theta)}{p(Y)} \tag{1}$$

where: $p(Y)$ is the marginal density of the observations included in Y; $p(\theta)$ is the prior density, it summarizes our beliefs upon θ before analysing the data, Y, and is subjectively determined by the researcher; $p(Y/\theta)$ is the likelihood function which gives the joint data density value conditionally to the maximum-likelihood estimate of θ; finally, the posterior density, $p(\theta \mid Y)$, combines the latter two pieces of information and expresses our knowledge about θ after looking at the data. The mean of the posterior density may be utilized as a point estimate, that is:

$$E(\theta_k \mid Y) = \int \theta_k \, p(\theta \mid Y) d\theta \tag{2}$$

and the posterior standard deviation may be interpreted as a measure of the degree of uncertainty of the point estimate, that is:

$$
\begin{aligned}
St.Dev. &= \sqrt{E(\theta_k^2 \mid Y) - [E(\theta_k \mid Y)]^2} \\
where \quad E(\theta_k^2 \mid Y) &= \int \theta_k^2 \, p(\theta \mid Y) d\theta
\end{aligned}
\tag{3}
$$

Yet, except special cases, (2) does not present an analytical derivation. Thus we have to resort to sampling algorithms (such as the Gibbs sampling and the Metropolist-Hastings algorithm).

Bayesian model comparison is undertaken by using the posterior odds ratios (Jeffreys, 1961. See also Gelfand and Dey, 1994; Geweke, 1999; Pettit and Young, 1990). Suppose that there exist n plausible theories to explain data $Y = [y, x]$, and that each of them can be summarized by a statistical model M_i with $i = 1,2....n$, which depends on parameters θ_i. The posterior density, the prior density and the likelihood function turn out now to depend on what model is being used. Accordingly (1) becomes:

$$p(\theta_i \mid Y, M_i) = \frac{p(Y \mid \theta_i, M_i) \times p(\theta_i, M_i)}{p(Y, M_i)} \tag{4}$$

We are interested in finding out which model is more likely to be given the data Y. By Bayes' theorem, we can also write:

$$p(M_i \mid Y) = \frac{p(Y \mid M_i) \times p(M_i)}{p(Y \mid M_i) \times p(M_i) + p(Y \mid M_j) \times p(M_j)} \tag{5}$$

where $i \neq j$, and $p(Y|M_i) = \int p(Y|\theta_i, M_i) p(\theta_i|M_i) d\theta_i$ is called marginal probability of the data given M_i. Expression (5) defines the posterior probability that M_i is correct (under the assumption that either M_i or M_j is correct, i.e. $p(M_i|Y) + p(M_j|Y) = 1$). An expression analogous to (5) can be derived relatively to M_j, $p(M_j|Y)$. The ratio between $p(M_i|Y)$ and $p(M_j|Y)$ gives the posterior odds ratio:

$$PO_{ij} = \frac{p(M_i|Y)}{p(M_j|Y)} = \frac{p(Y|M_i)}{p(Y|M_j)} \frac{p(M_i)}{p(M_j)} \tag{6}$$

that says to which extent data support M_i relatively to model M_j. The first factor on the right hand side of equation (6) is the Bayes' factor, B_{ij}, while the second factor is the prior odds ratio. In the absence of prior beliefs supporting one model against the other, the prior odds ratio is equal to one, and the Bayes' factor coincides with the posterior odds ratio, which turns out to be:

$$PO_{ij} = B_{ij} = \frac{p(Y|M_i)}{p(Y|M_j)} \tag{7}$$

If B_{ij} is larger that unity, we can say that model i is more likely than model j in explaining Y[7]. If, on the contrary, B_{ij} is smaller than unity, model M_j is suggested to be more likely than M_i. Notice that this should not be interpreted as a decisive proof for the validity of one model against another, but rather as a measure of relative support.

3.3 *Model specification and data details*

Given the described methodology, we aim at studying the effect of ownership concentration over employment protection allowing for co-determination of the two variables. To elicit this purpose we estimate a simultaneous two-equation model, whose general structural form may be expressed as follows:

$$\begin{aligned} y_1 &= \beta_1 y_2 + \beta_2 x_1 + \beta_3 x_2 + \varepsilon_1 \\ y_2 &= \beta_4 x_1 + \beta_5 x_3 + \varepsilon_2 \end{aligned} \tag{8}$$

where y_1 is an $(N \times 1)$ vector of observations on the dependent variable of interest, y_2 is an $(N \times 1)$ vector of observations on the endogenous variable, x_1, x_2 and x_3 are respectively $(N \times k_1)$, $(N \times k_2)$ and $(N \times k_3)$ matrixes of exogenous variables, $k = k_1 + k_2 + k_3$ being the total number of exogenous variables into the system. β_1 is a scalar parameter, while β_2, β_3, β_4 and β_5 are vectors of parameters. Finally, ε_1 and ε_2 are the $(N \times 1)$ vectors of

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[7] Jeffreys (1961) proposes the following rules of thumb for assessing the evidence provided by data: (*i*) $1 < B_{ij} <$ 3.16: the evidence slightly supports M_i; (*ii*) $3.16 < B_{ij} < 10$: the evidence moderately supports M_i; (*iii*) $10 < B_{ij} < 100$: the evidence strongly supports M_i; (*iv*) $100 < B_{ij}$: the evidence decisively supports M_i.

error terms. Defining $y = [y_1, y_2]$, $x = [x_1, x_2, x_3]$, and $\varepsilon = [\varepsilon_1, \varepsilon_2]$[8], model (8) may also be written in compact notation as:

$$\Gamma y = B x + \varepsilon \qquad (9)$$

where $\Gamma = \begin{bmatrix} 1 & -\beta_1 \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} \beta_2 & \beta_3 & 0 \\ \beta_4 & 0 & \beta_5 \end{bmatrix}$. Since Γ is an upper triangular matrix (and so is its inverse, Γ^{-1}), the system may be solved recursively and, providing that $k_3 \geq 1$, the necessary condition for identification is met. Furthermore, the triangular structure of (9) implies that $\det(\Gamma) = 1$ and, as a consequence, its likelihood function is the same as a seemingly unrelated regression (SUR, hereafter) model. The structural form of the model can thus be directly estimated using methods developed for SUR models, settling in this way the important prior elicitation and identification issues associated with SEM Bayesian estimation (see van Dijk, 2002; Richard and Steel, 1988; Koop, 2003; Koop and Tobias, 2003; and Koop, Poirer and Tobias, 2004). From (9), the reduced form of model (8) may also be written as:

$$y = \Phi x + \eta \qquad (10)$$

where $\Phi = \Gamma^{-1} B$ is the ($2 \times k$) matrix of parameters, and $\eta = \Gamma^{-1} \varepsilon$ is the matrix of error terms. We assume $\eta \,|\, x$ to be i.i.d. $N(0, H^{-1} \otimes I_N)$, H being the 2×2 error precision matrix.

Bayesian inference requires prior information for the unknown parameters Φ and H^{-1}, that are supposed to be independent. The marginal distribution of Φ is Normal (N) and such that $\Phi \sim N(\underline{\Pi}, \underline{H}_\Phi^{-1})$, while the marginal distribution of H is Wishart (W) with $\underline{v}$ degrees of freedom and mean equal to $\underline{v} \underline{S}^{-1}$, i.e. $H \sim W(\underline{S}^{-1}, \underline{v})$.

Endogenous and exogenous variables entering model (8) are suggested by the previous literature and explained as follows. The dependent variable in the first equation (y_1) is *Labour* (Botero et al., 2004) which is an index between zero and one and measures the protection of labour and employment laws including: cost and existence of alternative employment contracts, cost of increasing hours worked, cost of firing workers, and dismissal procedures. The dependent variable of the second equation (y_2), is *Concentr* (La Porta et al., 1999) which represents an ownership concentration index between zero and one and measures the "common shares owned by the top three shareholders in the ten largest non financial, privately-owned domestic firms in a given country" (La Porta et al., 2006: 9). We allow ownership concentration to affect labour regulation: *Concentr* also enters the first equation as an explanatory variable (albeit endogenous). A positive sign for the related coefficient hints a political reaction of labour to concentrated corporate governance forms in terms of stronger protection. On the other hand, where politics was able to anticipate economic forces, corporate governance forms could react to the concentration of labour

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[8] Furthermore, on the basis of the previous symbology, $\theta = [\beta_1, \beta_2, ..\beta_5, \sigma_{1\varepsilon}, \sigma_{2\varepsilon}]$.

interests and strong unionizations. Thus we include *Union density* (Botero et al., 2004) as an explanatory variable on the ownership concentration equation. This variable is the union density rate in 1997 and proxies the degree of workers' right representation. In the robustness checks we estimate the model also using *Left* (La Porta et al., 2006) in the place of *Union density*. *Left* is a measure for left power, and corresponds to the percentage of years between 1975 and 1995 during which the political orientation of the executive was leftist.

The other explanatory variables used in the system estimation are as follows. *Common* (La Porta et al., 1999) is a dummy variable for Common legal origins. *Eff government* (Kaufman et al., 2003) is a proxy for government effectiveness in 2000 and takes into account the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the credibility of the government's commitment to policies. It ranges between -2.5 and 2.5 with higher values standing for higher government effectiveness. *Eff judiciary* (International Country Risk Guide) measures the efficiency and integrity of the legal environment considering its impact on business. It ranges between 0 and 10 and is calculated between 1980 and 1983. *Antidir* (La Porta et al., 1998) is the index for anti-director rights and is obtained adding one when: shareholders are allowed to mail their proxy vote; shareholders are not required to deposit their shares before the general shareholder meeting; cumulative voting or proportional representation of minority shareholders is permitted; there exist mechanisms for protection of oppressed minorities; the minimum percentage of share capital to call for an extraordinary shareholders meeting is less than or equal to ten percent; finally, shareholders are entitled of pre-emptive rights that can be waved only by a shareholders meeting. *GDP* (La Porta et al., 2006) is the logarithm of per capita GDP in US dollars in 2000. Other variables used in the robustness checks are reported below. *Prop* (Pagano and Volpin, 2005) stands for 1986-1990 average proportionality, where the proportionality index equals 3 if 100% of the seats are assigned by proportional rule, equals 2 if the majority of the seats are assigned by proportional rule, 1 if the proportional rule applies to the minority of the seats and zero otherwise. *Investor protection* (La Porta et al., 2006) is an index that represents protection of the investor and reflects securities laws for financial markets discipline and private litigation (liability standards and mandate disclosure) and the antidirector rights. *Union index* (Botero et al., 2004) assesses the statutory protection and power of unions and is computed by averaging seven dummies for respectively: employees' unionization right, employees' collective bargaining rights, employees' legal duty to bargain with unions, collective contracts extended to third parties by law, closed shops allowed by law, workers', or unions', representation in the Boards of Directors, workers' councils mandatory by law. *Relations index* (Botero et al., 2004) corresponds to a measure of protection of collective relations laws and is computed as the average of the index for labour union power and the index for protection of workers in collective disputes. *Social security index* (Botero et al., 2004) is obtained as the average of three indexes that gauge the level of benefits for respectively: old

age, disability and death, sickness and health, and unemployment. The fact that the variables used in the analysis are measured in different reference periods is not an issue here since the cross-section variation largely dominates the variation over time.

In conclusion, the final baseline model can be expressed as follows:

$$Labour_i = \alpha_1 + \beta_1 Common + \beta_2 Concentr + \beta_3 Left + \beta_4\ Eff\ gov + \beta_5 GDP + u_{1i}$$
$$Concentr_i = \alpha_2 + \beta_6 Common + \beta_7 Antidir + \beta_8 Union + \beta_9\ Eff\ jud + \beta_{10} GDP + u_{2i}$$

(11)

In the sensitivity checks we experiment with alternative explanatory variables and further controls as explained in sub-section 3.5. Table 1 lists all the variables involved with summary statistics. We also report the expected sign relatively to each equation and a reference to previous data evidence for the suggested relation.

Before turning to the estimation results we need to specify our priors that are summarized in table 2. PRIOR1 is a diffused one where data evidence dominates the posterior outcome. All the parameters are assumed to follow a Normal distribution with mean equal to 0 and standard error equal to 5. The regression coefficients are all set at the point that corresponds to no effects on the dependent variables, but the large variance spreads considerably the density around the prior. This is equivalent to saying that we presume ignorance about model parameters. PRIOR2 is more informative since it contains prior information provided by the previous literature. In the first equation (*Labour*), coefficients on *Common*, *GDP* and *Left power* are supposed to have prior mean equal to, respectively, -0.5 -0.5 and 0.5, and prior standard error equal to 0.5.

Table 1. Descriptive statistics

Variable	Mean	St.Dev.	Expected sign	
			Labour Eq.	Ownership Eq.
Labour index	0.4574	0.1846	(dependent)	
Concentration	0.4272	0.1385	+ (BP05)	(dependent)
Union density	0.2959	0.2233	+ (Bot05)	+ (Roe03)
Left power	0.3375	0.2908	+ (Bot05)	+ (LP06)
Common law	0.3542	0.4833	- (Bot05)	- (LP06)
Eff government	0.8006	1.0192	+ (Bot05)	
GDP	8.7558	1.4749	+ (Bot05)	+ (LP06)
Antidirector rights	3.0000	1.3070		- (LP06)
Eff judiciary	7.6665	2.0507		- (LP06)
Proportionality	0.6473	0.4300	+ (PV05)	+ (PV05)
Investor protection	0.4711	0.2286		- (LP06)
Relations index	0.4410	0.1408	(dependent)	
Union index	0.4385	0.2020	(dependent)	
Social sec. index	0.6160	0.1999	(dependent)	

Note: Abbreviations in brackets in columns 4 and 5 stand respectively for: BP05 = Belloc and Pagano (2005), Bot05 = Botero et al. (2005), Roe03 = Roe (2003), LP06 = La Porta et al. (2006), PV05 = Pagano and Volpin (2005).

In the second equation (*Ownership concentration*), coefficients associated with *Common* and *Antidir* are both set with prior mean 0.5 and prior standard error 0.5. All the other parameters, about which we have no (or inconclusive) prior data evidence, are allowed to vary more around the prior means. In particular, in the first equation, *Concentr*, *GDP* and *Eff gov* are expected to have positive effects on the dependent variable (prior mean equal to 0.5), but a large variability (prior standard deviation equal to 5). In the second equation, the coefficient on *Union density* has a positive anticipated sign (prior mean equal to 0.5), whereas those on *GDP* and *Eff jud* are supposed to have a negative impact (prior mean equal to -0.5) on *Ownership concentration*, all with a prior standard deviation equal to 5. We also retain strong uncertainty on the constant terms (zero prior mean and prior standard errors equal to 5). PRIOR3 restricts the range within which parameters are allowed to move and, while maintaining the prior means as specified in PRIOR2, sets prior standard error equal to 0.5 for all the coefficients considered, except the constant terms.

Finally, we always maintain uninformative priors on the relevant parameters for $H(\underline{S}^{-1}, \underline{v})$ which is assumed to be distributed as a Wishart with 2 degrees of freedom (equal to the number of equations) and mean equal to 0 for each element of the matrix, i.e. $H \sim W(0_{2\times2}, 2)$. This choice is motivated by the fact that more informative priors are considered too restrictive by the relevant literature (see in particular Dreze and Richard, 1983).

Table 2. Priors

Variable	PRIOR1	PRIOR2	PRIOR3
Labour equation			
Constant	Normal (0, 5)	Normal (0, 5)	Normal (0, 5)
Common law	Normal (0, 5)	Normal (-0.5, 0.5)	Normal (-0.5, 0.5)
Concentration	Normal (0, 5)	Normal (0.5, 5)	Normal (0.5, 0.5)
Left power	Normal (0, 5)	Normal (0.5, 0.5)	Normal (0.5, 0.5)
Eff government	Normal (0, 5)	Normal (0.5, 5)	Normal (0.5, 0.5)
GDP	Normal (0, 5)	Normal (-0.5, 5)	Normal (-0.5, 0.5)
Ownership concentration equation			
Constant	Normal (0, 5)	Normal (0, 5)	Normal (0, 5)
Common law	Normal (0, 5)	Normal (-0.5, 0.5)	Normal (-0.5, 0.5)
Antidirector rights	Normal (0, 5)	Normal (-0.5, 0.5)	Normal (-0.5, 0.5)
Union density	Normal (0, 5)	Normal (0.5, 5)	Normal (0.5, 0.5)
Eff judiciary	Normal (0, 5)	Normal (-0.5, 5)	Normal (-0.5, 0.5)
GDP	Normal (0, 5)	Normal (-0.5, 5)	Normal (-0.5, 0.5)
$H \sim W(0_{2\times2}, \underline{2})$			

3.4 *Results*

Our two-equation SEM is estimated using the Gibbs sampler (Gelfand and Smith, 1990; Tanner, 1993). This is a method for posterior simulation largely adopted in linear regression model settings. We take 35,000 replications, with 5,000 burn-in replications discarded and the remaining 30,000 retained to compute the posterior features of interest.

Table 3 presents our estimation output. As one can notice results from respectively PRIOR1, PRIOR2 and PRIOR3 are very similar suggesting that data information is predominant[9]. All signs are as expected and, in a frequentist perspective, the posterior means of the regression coefficient always fall at least within the 10% confidence level (with the only exception of *GDP* in the *Labour equation* and of *Common laws* in the Ownership concentration equation).

With regard to the diagnostics, assessing the accuracy of the numerical approximations is essential in order to present reliable results with the Gibbs sampler. Thus, following Geweke (1992), we compute numerical standard errors (*NSE*) for the approximations of $E(\theta_k/Y)$. The $N\hat{S}E$ is given by $\hat{\sigma}_g/\sqrt{S}$, where $\hat{\sigma}_g$ is the estimated standard error of the importance function, $g(\theta)$, conditional to Y, and S is the number of replications of the Gibbs sampler (for more details see Geweke, 1992, and Koop, 2003). The obtained $N\hat{S}E$ are very small relative to posterior standard deviations of all parameters (not reported for reasons of space), so to indicate a high degree of accuracy, in spite of the limited number of observations.

A second diagnostic test suggested by Geweke (1992) is the convergence diagnostic (*CD*). It compares the estimated $E(\theta_k | Y)$ based on the first S_A replications (after the burn-in replications) and that based on the last S_B replications. If the two estimates turn out significantly different it means that not enough replications have being used by the sampler. The relevant statistics is given by $(\hat{g}_{S_A} - \hat{g}_{S_B})/(N\hat{S}E_{S_A} + N\hat{S}E_{S_B})$, where $\hat{g}_{S_A}$ and $\hat{g}_{S_B}$ are the estimates of $E(\theta_k | Y)$ based on respectively the first S_A and the last S_B replications, and $N\hat{S}E_{S_A}$ and $N\hat{S}E_{S_B}$ are the correspondent computed numerical standard errors. The *CD* statistics is distributed as a standard Normal. Our results, obtained setting $S_A = S_B = $ 10,000, are reported in the fifth, ninth and thirtieth columns of table 3 for respectively PRIOR1, PRIOR2 and PRIOR3. As one can notice the values obtained for the *CD* statistics are always smaller than the critical values from the standard Normal statistical table.

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[9] Estimated prior and posterior densities relative to PRIOR3 are reported in Appendix.

Table 3: Posterior results

Coefficient	Prior 1 (uninformative)				Prior 2 (informative)				Prior 3 (informative)			
	Mean	90% HPDI	NSE	CD	Mean	90% HPDI	NSE	CD	Mean	90% HPDI	NSE	CD
Labour equation												
Constant	0.1106	[-0.566, 0.708]	0.0124	-0.6403	0.0944	[-0.591, 0.698]	0.0169	0.2065	0.2410	[-0.293, 0.737]	0.0064	-0.5587
Common	-0.1959	[-0.287, -0.096]	0.0013	0.3941	-0.1957	[-0.287, -0.094]	0.0017	-0.3538	-0.2104	[-0.291, -0.125]	0.0008	0.2453
Concentration	0.9549	[0.371, 1.627]	0.0139	0.6664	0.9762	[0.379, 1.679]	0.0197	-0.2040	0.8073	[0.354, 1.299]	0.0083	0.3007
Left power	0.1675	[0.083, 0.252]	0.0003	0.2234	0.1702	[0.087, 0.254]	0.0004	0.7846	0.1698	[0.087, 0.253]	0.0003	0.9164
GDP	-0.0204	[-0.067, 0.029]	0.0006	0.5817	-0.0198	[-0.067, 0.030]	0.0008	-0.1417	-0.0268	[-0.070, 0.018]	0.0003	0.7636
Gov eff	0.1201	[0.068, 0.173]	0.0003	0.1625	0.1209	[0.068, 0.174]	0.0004	-0.4822	0.1187	[0.066, 0.171]	0.0003	0.0042
Ownership concentration equation												
Constant	0.9826	[0.841, 1.125]	0.0007	-0.4227	0.9820	[0.838, 1.126]	0.0008	-0.0339	0.9871	[0.845, 1.130]	0.0006	0.6255
Common	-0.0093	[-0.067, 0.049]	0.0004	0.0710	-0.0100	[-0.068, 0.048]	0.0006	0.5575	-0.0049	[-0.061, 0.052]	0.0003	-0.0879
Antidirectior	-0.0355	[-0.054, -0.019]	0.0002	0.3246	-0.0352	[-0.053, -0.018]	0.0003	-0.3583	-0.0375	[-0.055, -0.021]	0.0001	0.4653
Union dens	0.0913	[0.009, 0.176]	0.0004	-0.4873	0.0905	[0.009, 0.176]	0.0006	0.3478	0.0977	[0.012, 0.186]	0.0004	-0.1978
GDP	-0.0321	[-0.051,-0.013]	0.0001	-0.2792	-0.0322	[-0.052, -0.013]	0.0001	0.0769	-0.0315	[-0.051, -0.012]	0.0001	-0.8272
Jud eff	-0.0202	[-0.032,-0.009]	0.0001	0.7294	-0.0201	[-0.032, -0.009]	0.0001	-0.1349	-0.0211	[-0.033, -0.010]	0.0001	0.1510

NOTE: Total number of retained replications is 30,000, number of burn-in replications is 5,000.

We now turn to model comparison, which is implemented by Bayes factors. First, we perform nested model comparison. Accordingly, we compare the full model with an abridged model where one coefficient at a time is set to have zero prior mean and zero prior standard error. This is equivalent to saying that we constrain the associated variable to have no effect on the dependent variable, so challenging the relevance of our informative priors. More in detail, we proceed as follows. We compute the posterior log-likelihood of the full model (M_0), the posterior log-likelihood of the abridged model (M_1) and then take the ratio between the two: $B_{01} = p(Y/M_0)/p(Y/M_1)$. $B_{01} > 1$ indicates that the full model is more likely than the abridged model: thus theory representing model 1 is supported by the evidence. On the contrary, $B_{01} < 1$ hints that the abridged model is to be preferred to the full model in terms of (log-)likelihood maximization, and so the theory considered must be cast aside. As a second step we compare theories two-by-two (time by time denoted by respectively 1 and 2), implementing comparisons of the relevant non-nested models. Assume that M_0 denotes the full model, M_1 the abridged model without the effect suggested by theory 1, and M_2 the abridged model without the effect proposed by theory 2. We compute the ratio of the two Bayes factors between full and abridged models and obtain $B_{21} = B_{10}/B_{20} = p(Y|M_1)/p(Y|M_2)$. If $B_{21} > 1$, we can conclude that M_2 (model without effect for theory 2) is more likely than M_1 (model without effect for theory 1), providing theory 1 to be more likely than theory 2 in explaining the data.

Our results are shown in table 4 and are commented below with reference to the rules of thumb suggested by Jeffreys (1961) and reported in note 7. With regard to the first

Table 4. Model comparisons

Nested model comparison				Non-nested model comparison			
Models compared M_0/M_1	PRIOR1	PRIOR2	PRIOR3	Models compared M_2/M_1	PRIOR1	PRIOR2	PRIOR3
Labour equation							
Full/No Comm	21.0634	25.2075	164.8291	No Comm/No Own	5.5382	2.8628	3.0753
Full/No Conc	116.6543	72.1633	506.8719				
Full/No Left	31.1943	20.3199	97.7594	No Left/No Own	3.7396	3.5514	5.1849
Full/No GDP	0.9463	0.5878	2.3428	No GDP/No Own	123.2741	122.7685	216.3530
Full/No Eff gov	46.1334	26.3798	114.0451	No Eff gov/No Own	2.5286	2.7355	4.4445
Ownership concentration equation							
Full/No Comm	0.9008	3.8122	2.1194	No Comm/No Union	4.0622	4.2971	4.5019
Full/No Antidir	18.6853	104.4061	61.6605	No Antidir/No Union	0.1958	0.1569	0.1547
Full/No Union	3.6592	16.3815	9.5414				
Full/No GDP	2.8962	11.4023	6.3502	No GDP/No Union	1.2634	1.4367	1.5025
Full/No Eff jud	2.7701	12.3943	7.0037	No Eff jud/No Union	1.3210	1.3217	1.3623

NOTE: Total number of retained replications is 30,000, number of burn-in replications is 5,000.

equation, all the variables receive support in the data, with the only exception of *GDP* in the first equation. Indeed, in this case the full model is only weakly more likely than the corresponding abridged model according to PRIOR3, while it is suggested to be even less likely than the abridged model according to PRIOR1 and PRIOR2. More interestingly, *Common* and *Ownership concentration* present Bayes factor in their favor larger than 150. This indicates a decisive support for the associated theories. With regard to the second equation, we obtain that all variables find a quite mild support by the econometric output, but the *Antidirector rights*, which is largely preferred than other regressors in explaining *Ownership concentration* (although the correspondent Bayes factor is larger than 100 only when PRIOR2 is considered).

Finally, we perform, non-nested model comparison running "horse-races" between the theories considered. Relatively to the first equation we compare the abridged model for each theory with the model with no ownership concentration effect. We obtain that the latter is always dismissed by the Bayes factor test. The implemented experiment thus indicates that the concentration argument is far more influential than other arguments in the determination of workers rights. With regard to the ownership concentration equation, instead, we compare the various abridged models with the model where the "social democracy" effect suggested by Roe (2003) is assumed not to work. We obtain that Roe's argument is preferred by data against other theories but against that sustaining the antidirector rights effect that is always indicated to be the best determinant of the cross-country variation in corporate ownership structures.

3.5 *Robustness checks*

In this section we gauge the robustness of our previous conclusions. Since the three priors provide very consistent results, we only report estimation output relative to PRIOR3.

First, following La Porta et al. (2006), we replace *Union density* with the proxy for left power as regressor in the ownership concentration equation. This variable is to capture the negative effect of "social democracy" on corporate ownership dispersion, suggested by Roe (2003). We set prior mean and prior standard deviation of *Left power* both equal to 0.5. Results are in table 5.1. As one can notice our qualitative conclusions are unaltered. Furthermore, the results for the model comparison (not reported) do not change in any relevant way.

Second, Pagano and Volpin (2005) assess that the proportionality of the electoral system positively affect both workers rights' protection and ownership concentration. Accordingly, we include *Proportionality* as an additional explanatory variable in both equations. The existing data evidence (Pagano and Volpin, 2005) on the related parameters leads us to set 0.5 as prior mean and 0.5 as prior standard deviation. Results are shown in table 5.2. We observe that although the estimated coefficient on *Proportionality* are positive as expected, their posterior estimated values lie outside the 90% confidence interval, that

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means that, from a standard frequentist perspective, the associated effects would be considered not statistically significant.

Third, it may be argued that the index for antidirector rights representation is endogenous. To deal with this objection, we estimate the three-equation SEM that is reported below:

$$
\begin{aligned}
Labour_i &= \alpha_1 + \beta_1 Common + \beta_2 Concentr + \beta_3 Left + \beta_4\ Eff\ gov + \beta_5 \Pr op + \beta_6 GDP + \varepsilon_{1i} \\
Concentr_i &= \alpha_2 + \beta_7 Antidir + \beta_8 Union + \beta_9\ Eff\ jud + \beta_{10} GDP + \varepsilon_{2i} \\
Antidir_i &= \alpha_3 + \beta_{11} Common + \beta_{12}\ Eff\ jud + \beta_{13} \Pr op + \beta_{14} GDP + \varepsilon_{3i}
\end{aligned} \tag{12}
$$

For the model specification we follow La Porta et al. (2006) that use *Common* as an instrument for *Antidirector* (investor protection) excluded from the ownership concentration equation (notice also that this variable weakly enters the second equation in our basic model estimation). Furthermore we also include the index for proportionality of the electoral system in the first and third equations. Indeed, this specification better represents the effect proposed by Pagano and Volpin (2005) that focus on the simultaneous determination of labour protection and investor protection (not of ownership concentration). Previous evidence (La Porta et al., 1999; Pagano and Volpin, 2005) suggests the following informative priors for the *Antidirector* equation (mean, standard deviation): *Common* (0.5, 0.5); *Eff jud* (0.5, 0.5); *Prop* (-0.5, 0.5); *GDP* (0.5, 0.5). Econometric results are in table 5.3. Posterior estimates are consistent with expectations, and do not alter our previous qualitative conclusions.

Forth, the index for antidirector rights is replaced with the investor protection index, that is supposed to have the same prior quantities for the relevant parameters. Again our conclusions are corroborated.

Finally, we check for the sensitivity of our results to the choice of the labour protection index as measure of workers' rights protection. Botero et al. (2004) provide several measures for such a variable and namely: the *Relation index*, the *Union index*, and the *Social security index*. We estimate our SEMs adopting alternatively the three indexes as dependent variable in the first equation (output not reported). Again, we are not led to question our conclusions, since results are qualitatively consistent with the basic estimation.

Table 5.1: Robustness checks – Left power

	Labour equation				Ownership concentration equation		
Coefficient	Mean	90% HPDI	NSE	Coefficient	Mean	90% HPDI	NSE
Constant	0.3086	[-0.2043, 0.7922]	0.0066	Constant	0.9311	[0.7906, 1.0716]	0.0006
Common	-0.2090	[-0.2899,-0.1230]	0.0009	Common	-0.0085	[-0.0651, 0.0481]	0.0003
Concentr	0.7617	[0.3117, 1.2495]	0.0082	Antidir	-0.0420	[-0.0593,-0.0256]	0.0001
Left power	0.1160	[0.0019, 0.2268]	0.0008	Left power	0.0843	[0.0105, 0.1576]	0.0003
GDP	-0.0302	[-0.0729, 0.0137]	0.0003	GDP	-0.0245	[-0.0436, 0.0053]	0.0001
Eff gov	0.1207	[0.0671, 0.1744]	0.0003	Eff jud	-0.0198	[-0.0314,-0.0084]	0.0001

Table 5.2: Robustness checks – Proportionality

	Labour equation				Ownership concentration equation		
Coefficient	Mean	90% HPDI	NSE	Coefficient	Mean	90% HPDI	NSE
Constant	0.4102	[-0.1298, 0.9142]	0.0070	Constant	0.9837	[0.8414, 1.1264]	0.0006
Common	-0.1945	[-0.2751, 0.1093]	0.0007	Common	0.0020	[-0.0570, 0.0613]	0.0003
Concentr	0.7480	[0.2911, 1.2420]	0.0085	Antidir	-0.0365	[-0.0542,-0.0199]	0.0001
Left power	0.1468	[0.0660, 0.2283]	0.0003	Union dens	0.0768	[-0.0121, 0.1663]	0.0005
GDP	-0.0504	[-0.0969,-0.0024]	0.0004	GDP	-0.0334	[-0.0536,-0.0131]	0.0001
Eff gov	0.1416	[0.0894, 0.1943]	0.0003	Eff jud	-0.0209	[-0.0328,-0.0093]	0.0001
Prop	0.0756	[-0.0192, 0.1661]	0.0001	Prop	0.0295	[-0.0307, 0.0904]	0.0003

Table 5.3: Robustness checks – Endogenous antidirector

	Labour equation				Ownership concentration equation				Antidir. equation		
Coefficient	Mean	90% HPDI	NSE	Coefficient	Mean	90% HPDI	NSE	Coefficient	Mean	90% HPDI	NSE
Constant	-0.1878	[-0.8739, 0.4651]	0.0150	Constant	1.0044	[0.8585, 1.1508]	0.0011	Constant	0.4915	[-0.2493, 1.2293]	0.0021
Common	-0.1718	[-0.2569,-0.0821]	0.0016	Antidir	-0.0496	[-0.0826, -0.0166]	0.0005	Common	1.2872	[0.8554, 1.7173]	0.0026
Concentrat	0.6528	[0.0104, 1.3271]	0.0152	Union dens	0.0820	[-0.0124, 0.1756]	0.0005	Prop	-0.5694	[-1.0315,-0.1092]	0.0026
Left power	0.1482	[0.0589, 0.2382]	0.0004	Eff jud	-0.0152	[-0.0287, -0.0018]	0.0001	Eff jud	0.01112	[-0.1259, 0.1495]	0.0006
GDP	0.0367	[-0.0063, 0.0826]	0.0009	GDP	-0.0342	[-0.0528, -0.0155]	0.0001	GDP	0.2606	[-0.1085, 0.4159]	0.0006
Prop	0.0505	[-0.0276, 0.1278]	0.0007								

NOTE: Total number of retained replications is 30,000, number of burn-in replications is 5,000.

4. Conclusions

According to some political views, the introduction of corporate legislation similar to that of the US has the advantage to anticipate an inevitable global prevalence of the American model of corporate governance. The prevailing literature has many explicit or implicit suggestions on the obstacles that should be removed to achieve this result. Some of the policy implications stemming from the current work on comparative corporate governance examined in this paper are: the introduction of better minority shareholder protection (typical of the systems of common law), the reform of electoral systems favouring political electoral results (supporting shareholder democracy) and the removal of protective labour legislation (inducing expropriation fears of absentee share holders).

Our analysis does not have such straightforward policy implications.

In our view, American populism (keep capitalistic dynasties under control!) and European social democracy (create workers counter-power to powerful capitalist families!) have been two very different political strategies by which the various societies have made the concentration of power associated to large-scale production compatible with democracy and safeguarded the human capital investment of non-owners. Clearly, policy must here be interpreted as something broader than economic policy. Restricting the argument may well hide the fact that the suggested economic policies may have undesirable consequences for political democracy.

In terms of a narrower concept of economic efficiency, each form of business organization requires many complementary institutions. For this reason, disequilibrium situations, such as those encountered by Britain in the transition from one politics-business co-evolution path to another, are likely to be particularly painful. Once a particular set of business institutions is established, a country may often find a path to the accumulation of human and material capital that fits better these institutions. The complementarities among political power relations, business institutions and economic resources may make changes very difficult, even when they would go in the direction of more promising development paths. Moreover, in a globally integrated economic environment, each country may specialize in those sectors where it enjoys a comparative institutional advantage and extend the economic role of its specific institutions. Such productive and institutional specialization may make change even more difficult.

While our approach does not give strong support to any one of the solutions advanced in the literature, it is consistent with the possibility that, if the potential complementarities are taken into account, some combination of coherent policies may be beneficial. By contrast, one-sided measures, which import only one characteristic of a particular system of corporate governance, may decrease economic efficiency pushing the system towards a fitness valley of inconsistent attributes. And they may even upset the country-specific balance between economic power and political democracy.

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Appendix: Estimated prior and posterior densities – Prior3

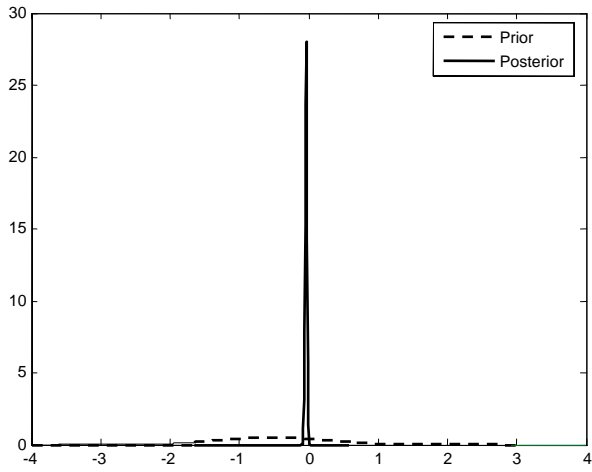Fig 1: *Estimated prior and posterior densities for β_1*
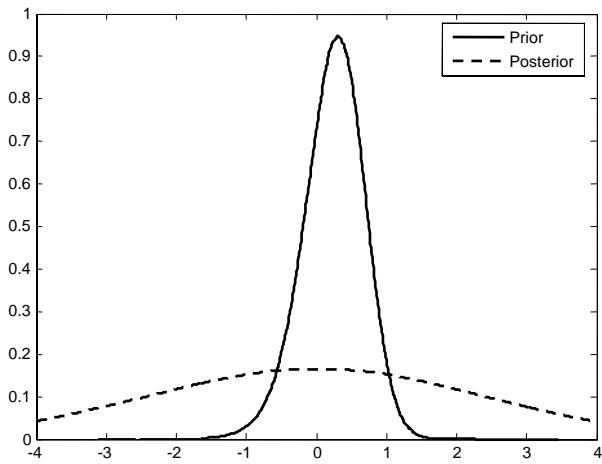
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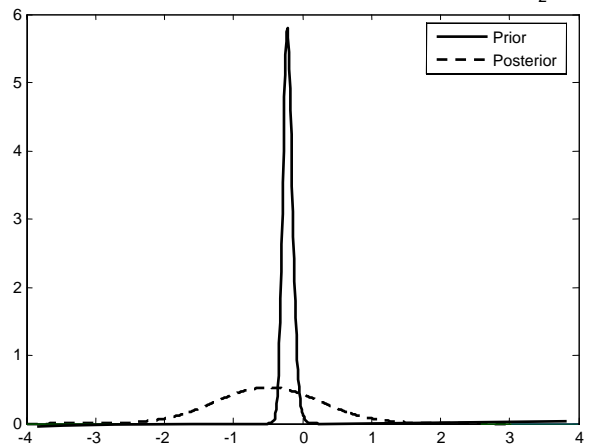
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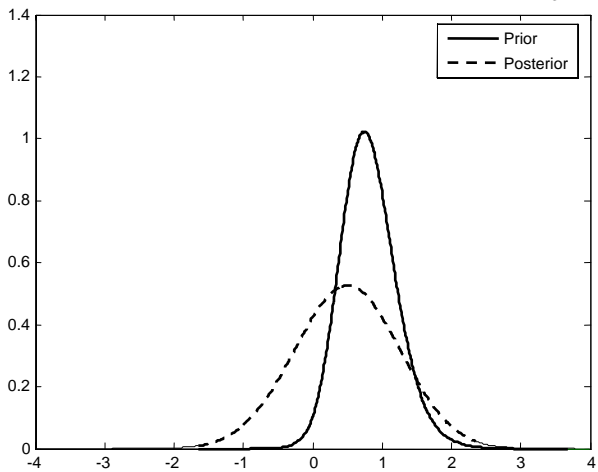
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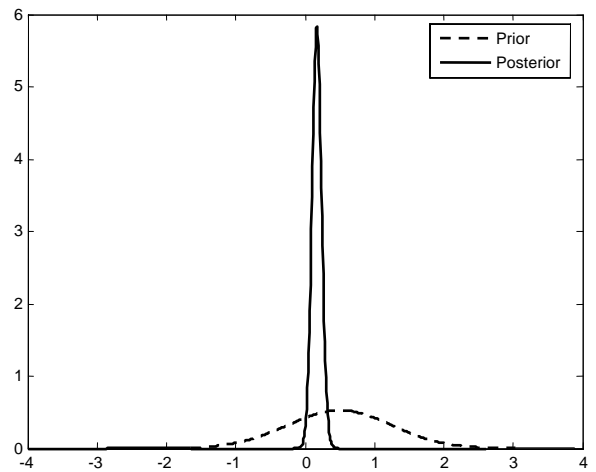
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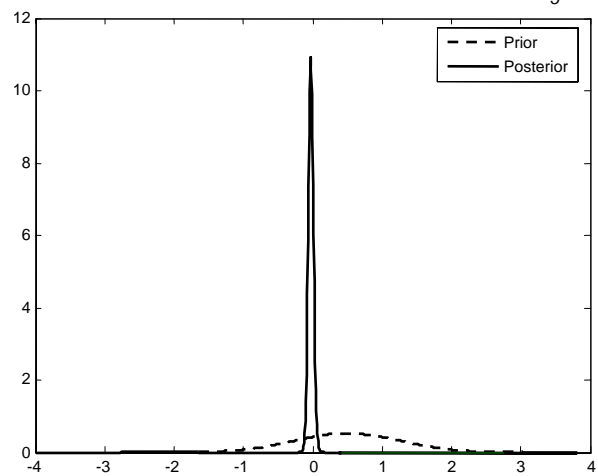
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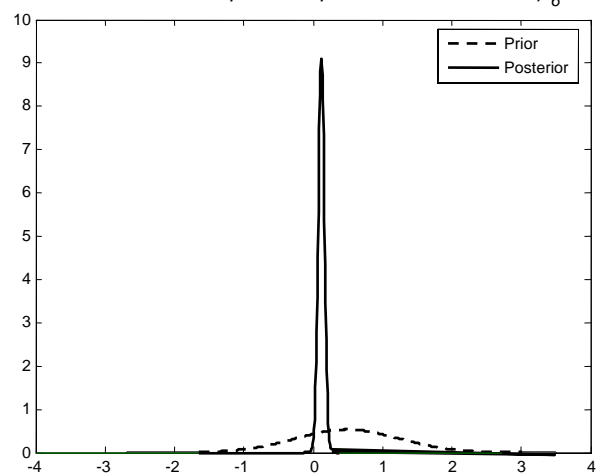
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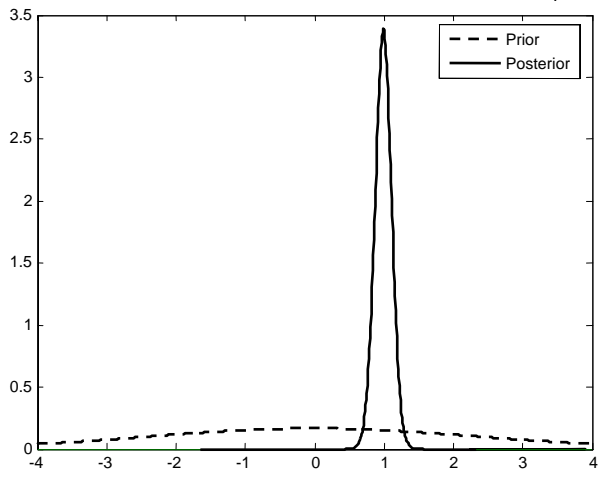
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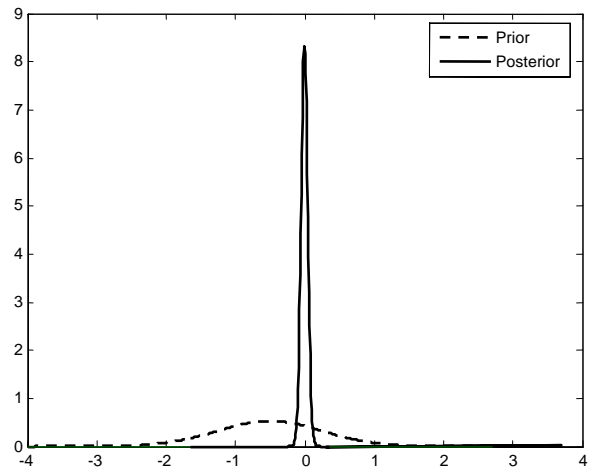
Fig 9: *Estimated prior and posterior densities for* β_9

Fig 10: *Estimated prior and posterior densities for* β_{10}

Fig 11: *Estimated prior and posterior densities for* β_{11}

Fig 12: *Estimated prior and posterior densities for* β_{12}

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