Politics-Business Interaction Paths *

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

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

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1. Introduction

The current crisis has marked new end of the end of history in corporate governance[1]. Before, the crisis, like the earlier successes achieved by Japan and Germany, the recent success of the American economy and the revival of the British economy had attracted the attention of many economists and policy makers. The legal origin approach claimed that the Anglo-American success was rooted in the different common law and civil law traditions which characterized these countries well before the advent of capitalism. In common law systems, private owners, including the minority shareholders of contemporary large firms, could be better protected. Other approaches had emphasized that the non-proportional electoral systems prevalent in the Anglo-American countries favored political coalitions, which are more friendly to shareholders. Legal and electoral reforms were advocated to change what was once upon a time an American exception into the general rule to be followed by all countries.

In a relatively recent past American institutions were not accepted as the natural ones and special reasons were given to explain the persistent divergence from other countries. Indeed, "American exceptionalism" has long been a puzzle for social scientists. However, the nature of the problem has somewhat changed over time. Becht and De Long (2005) have observed that a century ago academics like Werner Sombart were worried by the exceptional nature of the United States in that it did not have socialism, while today academics are concerned about a different form of American exceptionalism: the negligible role of block holding in the United States.

Mark Roe has suggested an interesting link between the past and the recent American puzzle. A tradition of very weak social democracy could explain the negligible role of block holding. According to Roe (2003), the higher the degree of social democracy (and, in particular, the strength of employees' rights), the stronger the tendency of employers to organize themselves into concentrated forms of corporate ownership with one or few major block holders. Figure 1 plots the residuals obtained from the regression of the labour protection index and of the ownership concentration index over log GDP per capita for 47 countries.[2] As 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 the cross-country differences in GDP per capita have been considered). According to this figure, American exceptionalism is an extreme case of a general relation linking employee job protection with the degree of separation between ownership and control. In order to explain the positive relation between protection of workers' rights and corporate

[1] Hansmann and Kraakman (2004) have even described 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 exist in modern capitalist economies, and that 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] The 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); GDP per capita in 2000 is from World Bank (2004); the ownership concentration index is from La Porta et al. (2006). See paragraph 3.3 for a more detailed description of the variables.

ownership concentration, Roe (2003) suggests that there is a causality relation which runs from employees' political rights to corporate governance forms.[3] One form of American exceptionalism (no socialism) has influenced the other (little block holding).

FIGURE 1 ABOUT HERE

Belloc and Pagano (2005, 2009) have argued that the relationship is more complex because the causation operates in two opposite directions. Forms of corporate governance, such as the degree of separation between ownership and control, influence the strength of workers' organization. When there is no separation between ownership and control, employees are more likely to seek protection against interference by the dominant block holders and their social circle, including their relatives and friends, who may otherwise monopolize the best jobs in 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 union activity. This two-way relationship entails multiple co-evolution paths between ownership concentration and workers' organization: a certain degree of centralization of one side's interests may easily induce a corresponding concentration of the other side's interests. As in an arms race, the interactions between business and politics can produce different degrees of organization in the owners' and workers' interests (Belloc and Pagano, 2009) and there is no reason for which one set of the resulting institutions should the natural outcome of an efficient legal or electoral system[4]. However, the latter routes have been taken by a great deal of the recent literature.

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 degrees of shareholder 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, and 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" because they improve market discipline. In particular, they show that laws imposing the mandatory disclosure of relevant information and those

[3] 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 similar vein, Mueller and Philippon (2007) argue 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.

[4] In one case the separation between ownership and control and the determination of employment protection on the basis of "better" corporate laws which stem from different legal origins (La Porta et al., 1998, 1999, 2006; Botero et al. 2005). In the other case it is due to different electoral processes, providing better protection for minority shareholders (Pagano and Volpin, 2005).

specifying liability standards have a positive and statistically significant impact on stock market development.

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.

Finally, Pagano and Volpin (2005) evaluate the simultaneous determination of shareholder and employment protection, stressing the role played by the proportionality of the voting system. Their 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 consider 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.

In this paper we seek to show that the *co-evolution* approach (Roe, 2003; Belloc and Pagano 2005, 2009) can explain better than the competing theories the variety of business and worker organizations that characterizes modern capitalist economies. We provide both qualitative and quantitative arguments in support of this claim. In the next section we produce theoretical and historical arguments in support of our hypothesis. In particular we will maintain that the paths of United Kingdom and Switzerland can be explained by the co-evolution approach while they are difficult to conciliate with the legal and electoral systems explanations. In section 3 we report Bayesian estimations and Bayesian model comparison among the various models of labour protection determination. We show that the co-evolution approach is more likely (is preferred in terms of likelihood maximization) than the competing explanations. Finally, in the last section, we conclude by briefly considering post-crisis scenarios and some preliminary policy implications of our analysis.

2. Competing Theories and Alternative Historical paths.

In his book *Strong Managers, Weak Owners*, Mark Roe (1994, p. 4) observed how, in spite of all the shortcomings today in the spotlight, the separation of ownership and control has allowed skilled managers to run firms and has prevented unskilled descendants from gaining control of firms they would be unable to run well. In similar vein, Chandler (1990) contrasted American and German managerial firms with British family firms at the time of the second industrial revolution, arguing that family control was the cause of England's poor performance.

Managerial hierarchies do not simply entail the usual problem that the interests of the managers must be made consistent with those of the shareholders; they also entail the broader, and somehow opposite, problem that the "family allocation of control" must not interfere with the firm's internal meritocracy and the incentives for good managerial performance. In spite of the well-known agency problems, the separation between ownership and control has had positive effects because it increases the role of competence allocation rules with respect to family connection ones.

The US was ideally suited to developing the meritocratic institutions necessary for the working of managerial hierarchies. It lacked the class divisions that had given rise to the dynastic assignment of many jobs in Europe. The weakness of American "social democracy" was related to the widespread feeling that membership of a lower class was not an insurmountable barrier against the achievement of economic power, and consequently that there was no imperative need to organize unions and other institutions which could tame the economic power of established capitalist dynasties.

The US was typically characterised by politicians who acted on the belief that a full-blown democracy (as well as their own "democratic power") was incompatible with the concentration of economic power. In this respect, a single cultural and political tradition comprised Jefferson's vision of a democracy based on small land owners, Jackson's clash with the power of the Bank of America, and Lincoln'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 (perhaps besides Switzerland[5]) where the landed aristocracy had no important cultural and political role in social life.

[5] There are remarkable similarities between the historical backgrounds of the US and Switzerland. Both countries are somehow geographically protected by foreign powers, respectively by oceans and tmountains, 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 early to tolerance of religious and ethnic diversity and the "cement of society" was more shared values and lifestyles than ethnic or religious homogeneity. Switzerland too achieved early liberation from feudal relations. Swiss feudal ties were traditionally weak: the peasants were difficult to dominate because they were often far from urban centres on Alpine pastures, and because they had good military training (they often serving as highly sought-after mercenaries throughout 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 war of secession terminated the political influence of the slave-owning landed aristocracy of the South) Swiss big business had "democratic origins" in the sense that a full blown post-feudal society had already emerged before the second industrial revolution.

Because of its anti-aristocratic attitude, the US reacted early to the concentration of economic power which came with the second industrial revolution. The Sherman Act (1890) was the first, and by far the most important, piece of anti-monopoly legislation to be enacted in a modern economy. After Theodore Roosevelt's clashes with big business, Wilson continued the endeavour to set limits on the power of the major block holders. The Clayton Act (1914) ruled that the ownership of substantial stakes in different firms might induce self-dealing and unfair competition and should therefore be supervised by anti-trust authorities. F.D. Roosevelt completed these policies by using taxation to dismantle the pyramids (Randall, 2004) that, in many cases, had enabled a few "economic royalists" to use "other people's money" to impose a "new industrial dictatorship" (Roosevelt quoted by Roe, 1994, p. 40).

While the American absence of social-democratic job protection allowed the radical diversification of asset ownership and the 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 so that it was 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 for workers to concentrate their 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 magnitude and radicalism did not develop.

The two-way causation between politics and business is also evident in those countries where there were marked class barriers, and where 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 also comprised cases, such as France, where the aristocracy had resisted revolutionary forces with varying degrees of success or, even more problematic ones 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, family dynasties exercised a power which upset the values of managerial meritocracy (Morck, 2005 and 2006). Wealth, family connections, the proper accent, social skills and even appropriate table manners interfered with the allocation of jobs based on effort and competence. In these circumstances, social-democratic movements readily emerged as spontaneous reactions against the privileges of the ruling dynasties and were reinforced by the widespread feeling that the "have-nots" had to be defended against the exercise, and often 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. Whilst "social democracy" could scare owners and prevent the separation of ownership and control, the combination

of ownership and control created the conditions for various types of "social-democratic" reaction, including unionization and the development of job protection.

Dispersed ownership and a low degree of "social democracy" can be seen as institutional complements to each other, and so too can concentrated ownership and a high degree of "social democracy". One explanation for these complementarity relations can be couched in terms of reciprocal disarmament and armament.[6] Each group can achieve a greater capacity to exercise power by concentrating dispersed interests in centralized agents which are better able to solve free-riding problems (Olson, 1965). As in an arms race game, all levels of armaments may be in equilibrium and define different countervailing balances of power (see Belloc and Pagano, 2009). For instance, the balance of power can remain the same if both owners and workers are dispersed or if both are concentrated. Thus defined are two extreme equilibria, which approximate the US and the countries clustered at the bottom-left corners of Figure 1. The self-reinforcing interactions between dispersed ownership and labour interests generate a *dispersed equilibrium*; similarly, the self-reinforcing interactions between concentrated ownership and centrally organized workers' interests generate a *concentrated equilibrium*.

In both the extreme and intermediate cases, the incentive for one side to concentrate its interests increases with the growing concentration of the other side's interests. 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. Ordinary market transactions may concentrate the ownership of capital into the hands of a few owners, and there will be a spontaneous tendency for this to happen whenever it increases profits. By contrast, because of non-slavery and self-ownership, the ownership of labour is necessarily dispersed and the concentration of labour cannot be achieved by means of standard economic contracts. In this case, politics can be used to stop the concentration of capital or to enhance the concentration of labour interests in trade unions.

Since market forces tend to concentrate capital and to disperse labour, in the 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 political measures are anticipated by spontaneous capitalist concentration, they react to the latter 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 are thus likely to arise in a democratic society.

The historical conditions under which a *dispersed equilibrium* is likely to come about are rather special, and they have perhaps been approximated only by the US. When the need for large scale companies arose, no other country (with the possible exception of Switzerland) had so many citizens

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

who had massively, and sometimes consciously, exited from dynastic feudal relations. Many of them had done so in search of religious freedom. Moreover, by revolting against British colonial rule, their ancestors had also broken with deference to established family dynasties. Only in America did such a strong ideology against "economic royalists" and "industrial dictatorship" (Roosevelt quoted by Roe, 1994, p. 40) exist before the age of large scale capitalist firms. A key component of this ideology was distaste for the type of concentrated dynastic interests characterising the old continent. Social respect moved from people born wealthy to "self-made" individuals. Thus, the meritocratic ascent of a corporate managerial ladder was far more compatible with American ideology than deferential respect for the concentrated power of the capitalist dynasties. Managers did not have to plot against concentrated owners: they were the unintended beneficiaries of a political struggle against concentrated interests (Roe, 1994). The public company run by managers was the unintended outcome of this struggle, and it prevailed because its internal promotion system was better suited than dynastic succession to the American political conditions and, more generally, to the American way of life. The very special conditions of American history enabled American politics to anticipate the concentration of the owners' interests in the way predicted by our politics-business co-evolution hypothesis: in one case, approximated by a *dispersed equilibrium*, the causation initially operated from politics to forms of business organization.

The historical conditions necessary for a *concentrated equilibrium* were quite commonly in place. 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 making "other people's money" available to the "economic royalists". The limited diversification of risks and the poor incentives for professional managers were (partially) off-set by the acquisition of many important management jobs by the ruling families and by a decrease in the agency problems arising from the separation between ownership and control. The inability of politics to anticipate the "armament of capitalism" subsequently induced a political reaction to arm labour by concentrating and organising its interests. Since, in most countries, politics had been unable to limit the concentration of the ownership interests, the resulting model of corporate governance provoked a "social democratic" political reaction. Thus, in most European countries the direction of the causation was consistent with the general prediction concerning the achievement of *concentrated equilibria*: politics reacted only belatedly to a model of corporate governance serving the concentrated interests of capitalist dynasties.

Since each type of institutional equilibrium (concentrated or dispersed) tends to exhibit 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 irreversibly shaped the paths of co-evolution followed by politics and corporate governance. However, in some cases, certain economic and political processes have shifted the

economy from one co-evolution path to the other, and during the transition, the organization of corporate governance and labour market institutions has been mismatched.

The UK is a particularly interesting case because it has gone through a long period of institutional mismatch. It has undergone 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, by that time, according to Chandler (1990), this type of capitalism had become outdated. The new industries which developed in the second half of the nineteenth century required some form of managerial capitalism. In Chandler's view, 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 that of *concentrated equilibrium*. However, certain forces slowly produced a substantial mutation in the characteristics of British capitalism. The 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 confined to the usual social and family circles. Indeed, in the 1970s 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 at times seemed to be leading to "continental solutions", such as pyramids and cross-share holding on the one hand, and "responsible" centralization of union activity on the other (Franks, Mayer and Rossi, 2005). These "continental solutions", however, were opposed by the City. Eventually, the Thatcher government made a sharp move towards a *dispersed* type of institutional equilibrium characterised by strong limitations on union activities and by a (much advertised) popular shareholding capitalism. These arrangements have not been substantially reversed by the subsequent Labour Party governments.

The UK's transition shows how the "political origins" of a certain country exert a long-lasting but not decisive influence on the characteristics of its economic system. They may be eventually reversed by some combination of spontaneous economic processes and conscious government policies. Explanation cannot rely solely on the allegedly permanent effects of "exogenous" origins and should instead 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 sufficiently large number of countries, relations such as those

considered in Figure 1 should be apparent. 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 try to quantify which model can better predict these institutional attractors that are taken at certain moment of time. However we wish to point out that the institutional changes that have occurred through time in specific countries can also offer a qualitative test for the different theories and we will conclude this section by trying to show that in this respect the co-evolution approach can offer a more convincing explanation of these changes.

According to legal origins theory, "common law systems" account for the emergence of public companies. This theory puts the US and the UK in the same category, but this does not fit with the fact that until recently the UK had "continental features" and could have easily become completely "continental". British institutions have moved closer to the US model only after the strong policies of Margaret Thatcher – a fact that it is difficult to conciliate with the legal origins theory but fits nicely with the explanation with the co-evolution approach.

Moreover, the co-evolution hypothesis is consistent with the case of Switzerland, which poses a rather difficult problem for the legal origins explanation. In terms of its legal system, Switzerland is clearly part of the continental tradition, 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 with the *co-evolution* hypothesis, for it is the only European country where, like in the US, the political role of the landed aristocracy had vanished by the time of the second industrial revolution. Moreover, again like the US, Switzerland had a precocious democratic federal political system with little sense of continental class divisions. Well before England, most Swiss Cantons were able to fulfil the political conditions for a "dispersed equilibrium" and fit the bottom-left corners of Figure 1.

A similar "historical" objection could be raised against 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 that of the US.

The qualitative historical evidence cited in this section provides some support for our hypothesis, but it is far from being conclusive. Each model and each explanation can have its exceptions and shortcomings, and one cannot rely solely on arguments focused on particular historical instances concerning specific countries. In this respect a quantitative evaluation of the competing models has very obvious advantages.

3. Comparing models: a Bayesian approach

3.1 *Empirical strategy and motivation*

In this section we report an econometric analysis carried out 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.[7] We adopt a Bayesian perspective in estimation and model comparison. Bayesian estimation is implemented by combining data likelihood with prior information to compute the posterior densities (Zellner, 1971). Bayesian model comparison is performed by using the posterior odds ratios (Jeffreys, 1961).[8] 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 a few simple rules of probability theory. While a more detailed description of the employed strategy is reported in Appendix A, in the remainder of this subsection we motivate the choice of the Bayesian approach in the present context.

First, as mentioned in the introduction, several recent studies have offered data evidence on alternative explanations for employment protection on the one hand (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, 2007; Roe, 2003). From this it follows that if one intends to study the *co*-determination of employment protection and ownership concentration without resorting to an arbitrary variable selection procedure, one needs 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 required in this context is to investigate the relative importance of one model with respect to another considering all the models that cannot be rejected by the data. The Bayesian methodology allows explicit account to be taken of model uncertainty when implementing model comparisons. Second, we choose Bayesian econometrics because of small sample data limitations. As frequently happens in cross-country analyses, our sample is small (47 data points). In the presence of only 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 to frequentist approaches in terms of parameter estimates (Gelman and Rubin, 1995; see also Raftery, 1995). If prior information on the parameters of interest is available, it can then be used to select the list of regressors to include in the model, and to assign prior distributions to the corresponding parameters that represent the 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 and political theories) as well as our co-evolution argument. The full model is estimated employing Bayesian estimation; finally, the various theories are compared by Bayesian nested and non-nested model comparison, as explained in the following subsections.

[7] 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.

[8] See also Gelfand and Dey (1994), Geweke (1999) and Pettit and Young (1990).

3.2 *Model specification and data details*

We estimate the following simultaneous equation model (SEM):

$$\begin{aligned} Labour &= \alpha_1 + \beta_1 Common + \beta_2 Concentr + \beta_3 Left + \beta_4 Eff\ gov + \beta_5 Gdp + \varepsilon_1 \\ Concentr &= \alpha_2 + \beta_6 Common + \beta_7 Antidir + \beta_8 Union + \beta_9 Eff\ jud + \beta_{10} Gdp + \varepsilon_2, \end{aligned} \quad (1)$$

where the error terms, ε_1 and ε_2, are i.i.d. $N(0,\sigma_{1\varepsilon}^2)$ and $N(0,\sigma_{2\varepsilon}^2)$, respectively. The dependent variable in the first equation, *Labour* (Botero et al., 2004), 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, *Concentr* (La Porta et al., 1999), 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 (albeit endogenous) variable. A positive sign for the related coefficient indicates a political reaction by labour to concentrated corporate governance forms in terms of stronger protection (Belloc and Pagano, 2009). On the other hand, when politics are able to anticipate economic forces, corporate governance forms may react to the concentration of labour interests and strong unionization. We therefore include *Union density* (Botero et al., 2004) as an explanatory variable in the ownership concentration equation. This variable is the union density rate in 1997, and it proxies the degree of workers' rights representation. In the robustness checks we estimate the model also using *Left* (La Porta et al., 2006) in place of *Union density*. *Left* is a measure of 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 the following. *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 account of 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 – Political Risk Services, 1996) 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 by 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 required to convene an extraordinary shareholders meeting is less than or equal to ten percent; finally,

shareholders are invested with pre-emptive rights that can be waived 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 investor protection and reflects securities laws for financial markets discipline and private litigation (liability standards and mandate disclosure) and 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 rights, 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 on 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 gauging 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. Table 1 lists all the variables involved with summary statistics. It also reports the expected sign relatively to each equation and gives a reference to previous data evidence for the suggested relation.

TABLE 1 (DESCRIPTIVE STATISTICS) ABOUT HERE

Defining $y = [Labour, Concentr]$, $x = [1, Common, Left, Eff\ gov, Antidir, Union, Eff\ jud, Gdp]$ and $\varepsilon = [\varepsilon_1, \varepsilon_2]$, model (1) may also be written in compact notation as:

$$\Gamma y = \mathrm{B}x + \varepsilon, \tag{2}$$

where ε is i.i.d. $N(0, \Sigma^{-1} \otimes I_N)$, $\Gamma = \begin{bmatrix} 1 & -\beta_2 \\ 0 & 1 \end{bmatrix}$, $\mathrm{B} = \begin{bmatrix} \alpha_1 & \beta_1 & \beta_3 & \beta_4 & 0 & 0 & 0 & \beta_5 \\ \alpha_2 & \beta_6 & 0 & 0 & \beta_7 & \beta_8 & \beta_9 & \beta_{10} \end{bmatrix}$ and $\Sigma = \begin{bmatrix} \sigma_{1\varepsilon}^{-2} & 0 \\ 0 & \sigma_{2\varepsilon}^{-2} \end{bmatrix}$ is the precision matrix. Since Γ is an upper triangular matrix (and so is its inverse, Γ^{-1}), the system may be solved recursively and the necessary condition for identification is met. Furthermore, the triangular structure of (2) implies that det(Γ) = 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 estimated directly using methods developed for SUR models, thereby settling

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 (2), the reduced form of model (1) may be written as:

$$y = \Phi x + \eta \tag{3}$$

where $\Phi = \Gamma^{-1}B$ is the matrix of parameters, and $\eta = \Gamma^{-1}\varepsilon$ is the matrix of error terms. We assume η to be i.i.d. $N(0, H^{-1} \otimes I_N)$, $H = \Gamma^{-1}\Sigma^{-1}\Gamma^{-1}$ being the 2 × 2 precision matrix. Bayesian inference requires prior information about the unknown parameters Φ and H^{-1}, which 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 $\underline{\nu}$ degrees of freedom and mean equal to $\underline{\nu}\underline{S}^{-1}$, i.e. $H \sim W(\underline{S}^{-1}, \underline{\nu})$.

3.3 *Priors*

Before turning to the estimation results we need to specify our priors, which 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 corresponding to no effects on the dependent variables, but the large variance considerably spreads 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 means equal to, respectively, -0.5 -0.5 and 0.5, and prior standard errors equal to 0.5. 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 weak) 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 $H(\underline{S}^{-1}, \underline{\nu})$ 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. $H \sim W(0_{2\times 2}, 2)$. The reason for this choice is that more informative priors are considered too restrictive by the relevant literature (see in particular Dreze and Richard, 1983).

TABLE 2 (PRIORS) ABOUT HERE

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 widely 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 will be seen, the results from respectively PRIOR1, PRIOR2 and PRIOR3 are very similar, suggesting that data information is predominant.[9] All signs are as expected and, from a frequentist perspective, the posterior means of the regression coefficient always fall at least within the 10% confidence level (the only exceptions being *Gdp* in the Labour equation and *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. Following Geweke (1992), we report the numerical standard errors (*NSE*) for the approximations of the point estimates, and the convergence diagnostics (*CD*). The computed *NSE*, which are reported in table 3, are very small relative to posterior standard deviations of all parameters (not reported for reasons of space) and indicate a high degree of accuracy despite the limited number of observations. The *CD*, which test the difference between the point estimates based on the first 10,000 replications (after the burn-in replications) and that based on the last 10,000, are also shown in table 3. As will be seen, the values obtained for the *CD* statistics are always smaller than the critical values from the standard Normal statistical table.

TABLE 3 (POSTERIOR RESULTS) ABOUT HERE

We now turn to model comparison, which is implemented by Bayes factors. First, we perform nested model comparison. Accordingly, we compare the full model (M_0) with an abridged model where one coefficient at a time is set to have zero prior mean and zero prior standard error (M_1). This is equivalent to saying that we constrain the associated variable to have no effect on the dependent variable, thereby challenging the relevance of our informative priors. More in detail, we proceed as follows. We compute the posterior log-likelihood of the full model, $p(Y|M_0)$, the posterior log-likelihood of the abridged model, $p(Y|M_1)$, and then take the ratio between the two, obtaining the

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

Bayes' factor: $B_{01} = p(Y|M_0)/p(Y|M_1)$. $B_{01} > 1$ indicates that the full model is more likely than the abridged model: thus the theory representing model 1 is supported by the evidence. By contrast, $B_{01} < 1$ indicates that the abridged model is preferable to the full model in terms of (log-)likelihood maximization, so that the theory considered is to be discarded. As a second step we compare theories two-by-two (time by time denoted by respectively 1 and 2), conducting comparisons of the relevant non-nested models. We 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 $B_{21} = B_{10} / B_{20} = p(Y \mid M_1) / p(Y \mid M_2)$. 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) given the data, providing that theory 1 is a better explanation of the data than theory 2. Note that this should not be interpreted as decisive proof of the validity of one model against another, but rather as a measure of relative support.

Our results are shown in table 4 and are commented on below relying on the *rule of thumb* suggested by Jeffreys (1961).[10] With regard to the first equation, all the variables receive support in the data, with the sole exception of *Gdp* in the first equation. Indeed, in this case the full model is only slightly 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 factors in their favor larger than 150. This furnishes decisive support for the associated theories. With regard to the second equation, all variables receive quite modest support from the econometric output, but *Antidirector rights* is largely preferred to the other regressors in explaining *Ownership concentration* (although the corresponding Bayes factor is larger than 100 only when PRIOR2 is considered).

Finally, we perform a non-nested model comparison by 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 (from *Business* to *Politics*). The latter is always dismissed by the Bayes factor test. The experiment thus indicates that the concentration argument is much more influential than other arguments in the determination of workers rights. With regard to the ownership concentration equation, we instead compare the various abridged models with the model where the "social democracy" effect (from *Politics* to *Business*) suggested by Roe (2003) is assumed not to work. We find that Roe's argument is preferred by the data against other theories (the sole exception being the antidirector rights effect that is always indicated to be the best determinant of the cross-country variation in corporate ownership structures).

TABLE 4 (MODEL COMPARISONS) ABOUT HERE

[10] (*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.

3.5 *Robustness checks*

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

First, following La Porta et al. (2006), we replaced *Union density* with the proxy for left power as regressor in the ownership concentration equation. This variable captures the negative effect of "social democracy" on corporate ownership dispersion, as suggested by Roe (2003). We set both prior mean and prior standard deviation of *Left power* equal to 0.5. The results are given in table 5.1, from which it will be seen that our qualitative conclusions are unaltered. Furthermore, the results for the model comparison (not reported) do not significantly change.

Second, Pagano and Volpin (2005) have found that the proportionality of the electoral system simultaneously affects both workers rights' and investors' protection. Accordingly, we include *Proportionality* as an additional explanatory variable in both equations. The existing data evidence (Pagano and Volpin, 2005) on the related parameters induces us to set 0.5 as prior mean and 0.5 as prior standard deviation. The results are shown in table 5.2, where one observes that, although the estimated coefficient on *Proportionality* are positive as expected, their posterior estimated values lie outside the 90% confidence interval. This 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 reported below:

$$\begin{aligned} Labour &= \alpha_1 + \beta_1 Common + \beta_2 Concentr + \beta_3 Left + \beta_4\, Eff\ \ gov + \beta_5\, \mathrm{Prop} + \beta_6 Gdp + \varepsilon_1 \\ Concentr &= \alpha_2 + \beta_7 Antidir + \beta_8 Union + \beta_9\, Eff\ \ jud + \beta_{10} Gdp + \varepsilon_2 \\ Antidir &= \alpha_3 + \beta_{11} Common + \beta_{12}\, Eff\ \ jud + \beta_{13}\, \mathrm{Prop} + \beta_{14} Gdp + \varepsilon_3 \end{aligned} \tag{12}$$

For the model specification we follow La Porta et al. (2006), who used *Common* as an instrument for *Antidirector* (investor protection) excluded from the ownership concentration equation (note also that this variable weakly enters the second equation in our basic model estimation). Furthermore we also include the index for the electoral system's proportionality in the first and third equations. This specification better represents the effect proposed by Pagano and Volpin's (2005) study that focuses 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) suggested 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). The econometric results are set out in table 5.3. The posterior estimates are consistent with expectations and do not alter our previous qualitative conclusions.

Fourth, the index for antidirector rights is replaced with the investor protection index, which was expected to have the same prior quantities for the relevant parameters. Again our conclusions are corroborated.

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

Finally, all the previous conclusions remain unchanged if we consider OECD countries only (results are available from the authors upon request).

TABLE 5.1 (LEFT POWER) ABOUT HERE

TABLE 5.2 (PROPORTIONALITY) ABOUT HERE

TABLE 5.3 (ENDOGENOUS ANTIDIRECTOR) ABOUT HERE

4. Conclusion.

The approaches focusing on legal and electoral systems contained a clear policy implication: one should reform these systems to allow the coming of a particular final and efficient variety of capitalism which was already prevailing in the United States and the United Kingdom. The co-evolution approach had no simple prescription and was rather warning about the dangers of hybridising economic systems which had co-evolved complementary institutions.

In the co-evolution framework, American populism (keep capitalistic dynasties under control!) and European social democracy (create workers' counter-power to powerful capitalist families!) were interpreted as two very different political strategies sharing a common purpose: both made the concentration of power associated with large-scale production compatible with democracy and safeguarded the human capital investment of non-owners.

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 its transition from one politics-business co-evolution path to another, are likely to be particularly painful. Once a particular set of business institutions has been established, a country may often find a path to the accumulation of human and material capital that is better suited to those institutions. The complementarities among political power relations, business institutions and economic resources may make changes very difficult to accomplish, even when they are 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 (Pagano, 2007; Belloc and Bowles 2009). Such productive and institutional specialization may make change even more difficult.

Only 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 and push the system towards a fitness valley of inconsistent attributes. And they may even upset the country-specific balance between economic power and political democracy.

Part of the crisis can indeed be blamed on the hybridization of different systems. To mention few examples German banks invested in risky securities of foreign and severed their symbiotic relations with local firms and their employees. The Glass Steagall act, which marked an important systemic difference between the marked based dispersed American system and German universal banking, was repealed. Most regulations, which guaranteed the workings and the competitiveness of American financial markets, were dismantled while the institutions, such as the German codetermination system, which balanced the concentrated employers power were weakened.

In the present crisis the pre-hybridization recent past arrangements are likely to be powerful attractors and may offer the key for understanding possible scenarios and their policy implications. There are however many obvious limitations for reading future event through the lenses of the past. In the first place, at least one country, England, had a not so remote past different from its recent arrangements that have made it the simplifications of many theories a permanent member of the so-called Anglo-Saxon model. In this case the past attractor is doubtful. Secondly the crisis is genuinely a global one where international arrangements have played an important role[11] and limit the diversification of countries according to their past attractors. For this reason, many institutional arrangements must be negotiated at international level. Finally, in spite of the perseverance through many decades of national politics-business interaction paths, history is never repeating itself. The future is also a product of our (mis)conceptions. Each paper (including the present one) is a very tiny addition to their enormous stock but a sufficient reminder of its unpredictability.

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[11] Global rights such as IPR set limits to this diversity. They set also limits to the quantities and to the typologies of investments and may be one of the causes of the current crisis (Pagano and Rossi, 2009)

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Appendix A

A.1 Estimation

In this appendix we briefly review the econometric approach adopted (for a more detailed textbook treatment see, for instance, Koop, 2003, on which we draw in our exposition below). Assume we have a matrix of data $Y = [y, x]$ and a vector of parameters $\theta = [\theta_1, \theta_2, .. \theta_k, ...]$ and want to learn about the parameters θ given the data *Y*. We can apply Bayes' theorem, which states that:

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

$p(Y)$ is the marginal density of the observations included in *Y*. $p(\theta)$ is the prior density: it summarizes our beliefs about θ before analysing the data, *Y*, and is subjectively determined by the researcher. $p(Y \mid \theta)$ 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:

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

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

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

Except special cases, (A.2) does not present an analytical derivation. We must consequently resort to sampling algorithms (such as the Gibbs sampling and the Metropolist-Hastings algorithm).

A.2 Model comparison

Bayesian model comparison is performed by using the posterior odds ratios. 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 $i = 1,2 \ldots n$, which depends on parameters θ_i. The posterior density, the prior density and the likelihood function now turn out to depend on what model is being used. Accordingly (A.1) becomes:

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

We are interested in determining which model is more likely to be (preferred in terms of likelihood maximization) given the data *Y*. By Bayes' theorem, we can also write:

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

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

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

which states the extent to which the data support M_i relatively to model M_j. The first factor on the right hand side of equation (A.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:

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

If B_{ij} is larger than unity, we can say that model *i* is more likely than model *j* in explaining *Y*. If, on the contrary, B_{ij} is smaller than unity, model M_j is suggested to be more likely than M_i.

A.3 Diagnostic tests

Following Geweke (1992), we compute numerical standard errors (*NSE*) for the approximations of the point estimates, $E(\theta_k \mid Y)$. The $\hat{NSE}$ 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). A second diagnostic test suggested by Geweke (1992) is the convergence diagnostic (*CD*). This compares the estimated $E(\theta_k \mid Y)$ 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 to be significantly different, this means that not enough replications have been used by the sampler. The relevant statistics is given by $(\hat{g}_{S_A} - \hat{g}_{S_B}) / (\hat{NSE}_{S_A} + \hat{NSE}_{S_B})$, where $\hat{g}_{S_A}$ and $\hat{g}_{S_B}$ are the estimates of $E(\theta_k \mid Y)$ based on respectively the first S_A and the last S_B replications, and $\hat{NSE}_{S_A}$ and $\hat{NSE}_{S_B}$ are the corresponding computed numerical standard errors. The *CD* statistics is distributed as a standard Normal.

Figure and tables

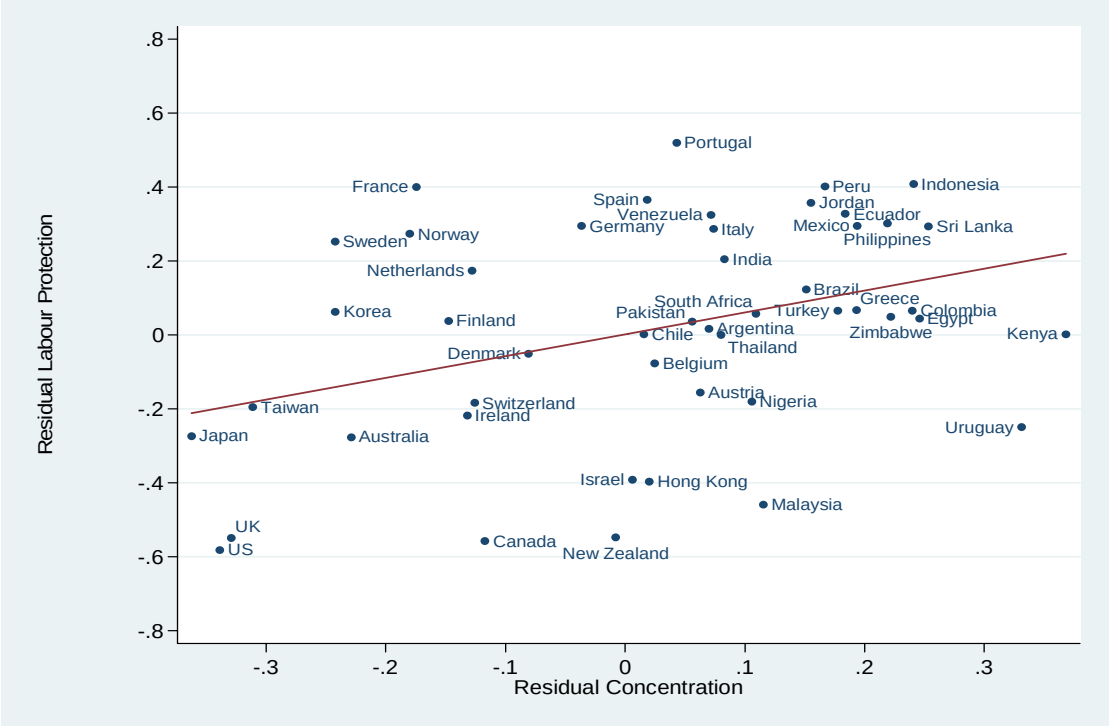

Figure 1. Partial regression plot of labour protection index and ownership concentration (independent variable is log GDP per capita). Coef. = 0.5916 (p-value = 0.006).

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	+ (BP09)	(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 security index	0.6160	0.1999	(dependent)	

Note: Abbreviations in brackets in columns 4 and 5 stand respectively for: BP05 = Belloc and Pagano (2009), Bot05 = Botero et al. (2005), Roe03 = Roe (2003), LP06 = La Porta et al. (2006), PV05 = Pagano and Volpin (2005).

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)
$H \sim W(0_{2\times 2}, \underline{2})$			

Table 3: Posterior results

	Prior 1 (uninformative)				*Prior 2 (informative)*				*Prior 3 (informative)*			
Coefficient	*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.

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 *Common*	21.0634	25.2075	164.8291	No *Common*/No *Own*	5.5382	2.8628	3.0753
Full/No *Concentr*	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 *Common*	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.

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
Concentration	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	*Log 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
Concentration	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 density*	0.0768	[-0.0121, 0.1663]	0.0005
Gdp	-0.0504	[-0.0969,-0.0024]	0.0004	*Log 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
Concentration	0.6528	[0.0104, 1.3271]	0.0152	*Union density*	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	*Log 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.

Appendix B: Estimated prior and posterior densities (Prior3)

Fig B.1: *Estimated prior and posterior densities for* β_1

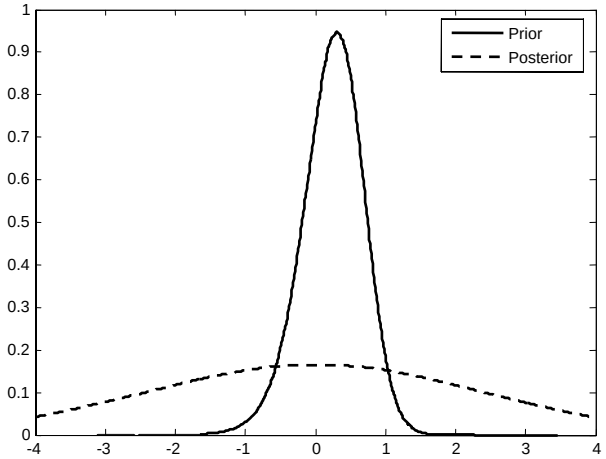

Fig B.2: *Estimated prior and posterior densities for* β_2

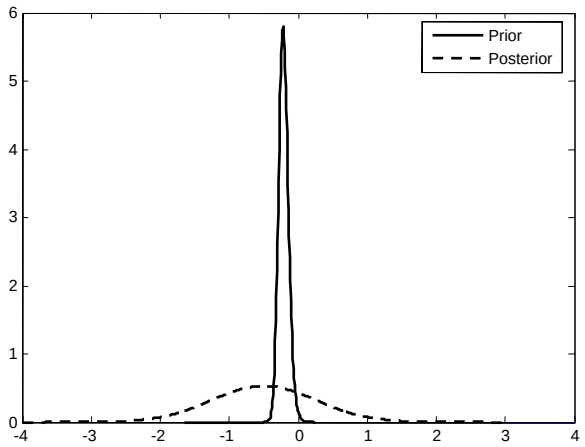

Fig B.3: *Estimated prior and posterior densities for* β_3

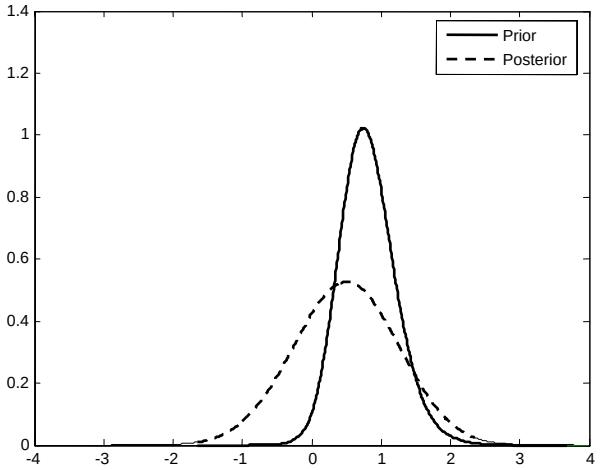

Fig B.4: *Estimated prior and posterior densities for* β_4

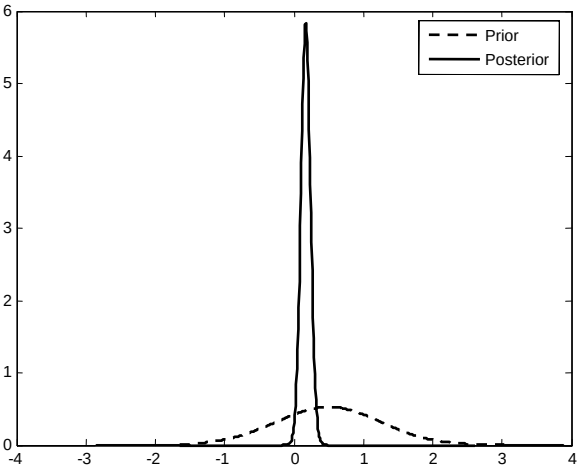

Fig B.5: *Estimated prior and posterior densities for* β_5

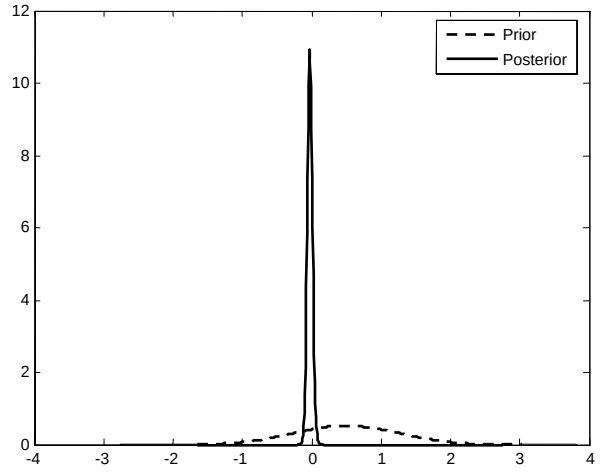

Fig B.6: *Estimated prior and posterior densities for* β_6

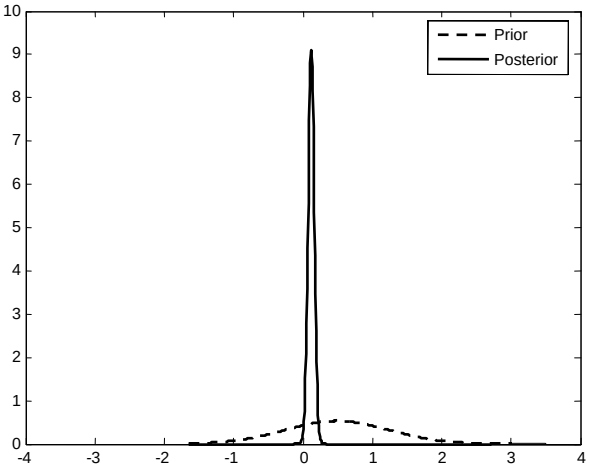

Fig B.7: *Estimated prior and posterior densities for* β_7

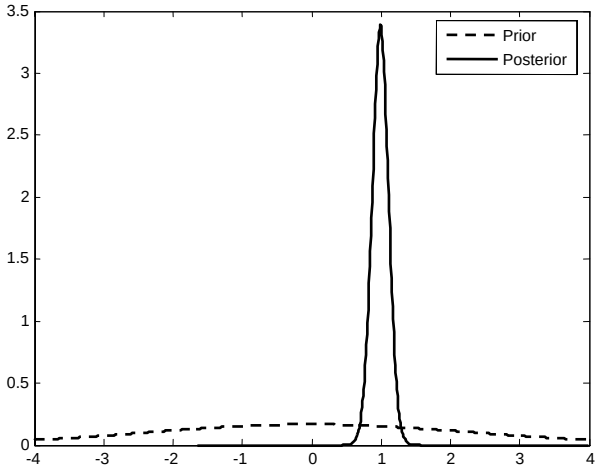

Fig B.8: *Estimated prior and posterior densities for* β_8

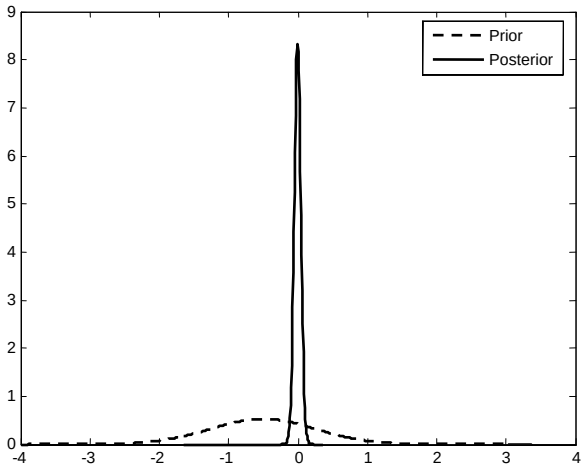

Fig B.9: *Estimated prior and posterior densities for* β_9

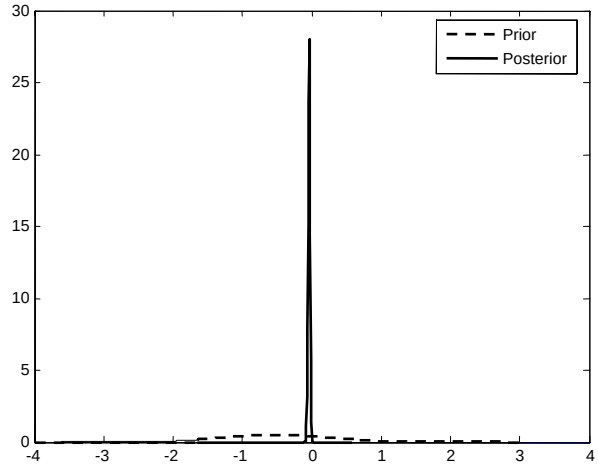

Fig B.10: *Estimated prior and posterior densities for* β_{10}

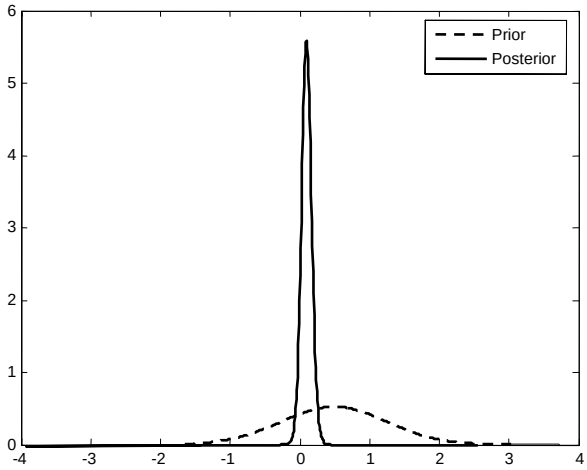

Fig B.11: *Estimated prior and posterior densities for* β_{11}

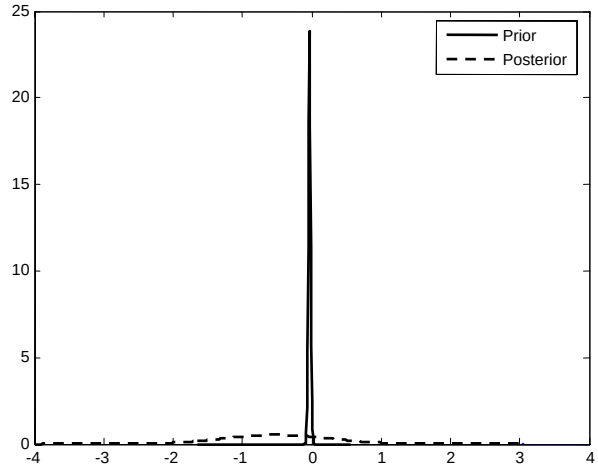

Fig B.12: *Estimated prior and posterior densities for* β_{12}