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Institutional complementarity, firm behavior, and firm heterogeneity: A cross-national analysis

Abstract: How do political economic institutions and different types of institutional complementarity in particular influence firm behavior? Existing studies do not offer much help in answering this question. In this research, we systematically connect institutional complementarity and its two distinct logics (the logic of reinforcement and the logic of compensation) to firm performance. Using a sample of more than fourteen thousand firms from twenty advanced industrial democracies, our empirical analysis finds that institutional complementarity is related to firm performance in a distinct way. That is, the different logics of institutional complementarity apply only to specific segments of the economy. While the logic of reinforcement works for small firms and labor-intensive firms, the logic of compensation favors large firms and capital-intensive firms. The empirical novelty of our research lies in offering a cross-national, firm-level and large-n analysis of institutional complementarity. Theoretically, our finding of firm heterogeneity helps in establishing the boundary conditions of institutional complementarity and hence advances the general understanding of the subject.

***Keywords*:** institutional complementarity, firm-level analysis, varieties of capitalism, firm performance, firm heterogeneity

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Introduction

How do national political economic institutions influence firm economic behavior? In particular, does the complementarity of these institutions (based on either a logic of reinforcement or of compensation) make a systematic difference in firm performance? Most studies of institutional complementarity either ignore

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its impact at the firm level or take it for granted.[1] Only a few studies have assessed institutional complementarity with firm-level outcomes, such as innovation, human resource management policies, and CEO compensation.[2] Instead, they have either employed a single-country focus or have overlooked firm heterogeneity in experiencing institutional complementarity. In this study, we offer a cross-national firm-level analysis of the impact of institutional complementarity. In particular, we use a sample of more than fourteen thousand firms from twenty advanced, industrial democracies and relate multiple measures of institutional complementarity to firm performance. Our empirics investigate both the impact of institutional complementarity on firm performance and firm heterogeneity in experiencing this impact.

Our research makes important empirical and theoretical contributions to the debate on institutional complementarity. First, the scarce attention to firms in empirical analyses of institutional complementarity leaves an important gap in the understanding of the subject. Firms are key to various conceptions of institutional complementarity, such that their response to their institutional environment is conceived as the principal process in understanding how institutional complementarity comes about and operates.[3] In fact, firms are so central to the debate on institutional complementarity that it is not farfetched to claim that this debate has given rise to a firm-centric political economy. However, the analytical weight that firms receive in theoretical debates is almost completely lost in empirical research. As noted in prior research,[4] studies test institutional complementarity at either the national or sectoral level, paying scant attention to whether economic agents actually respond to institutional complementarity at all. There is no systematic large-n cross-national analysis of firms that tests the core claims from the existing literature. Our research attempts to fill this gap.

Second, our research identifies firm heterogeneity in the experience of institutional complementarity. Prior research has alluded to firm heterogeneity, but due to the limited use of firm-level data, this has not been rigorously tested.[5] We offer the most systematic evidence to date of firm heterogeneity in the study of institutional complementarity, which in turn sheds important light on the boundary conditions for institutional complementarity. Scholars have presented different

1 Amable (2000); Campbell and Pedersen (2007); Crouch (2005a); Hall and Gingerich (2004, 2009); Markus and Mendelski (2015); Kenworthy (2006).

2 Allen (2006); Allen et al. (2017); Kirchner (2016); Greckhamer (2016).

3 Milgrom and Roberts (1995); Hall and Soskice (2001); Hall and Gingerich (2009); Hancké et al. (2007); Crouch (2005b).

4 Allen (2013); Deeg and Jackson (2007).

5 Allen (2004); Crouch (2005b).

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perspectives on institutional complementarity, which can be subsumed under two general logics: the logic of reinforcement and the logic of compensation.[6] The logic of reinforcement posits that complementarity arises when institutions share a common organizational principle and present a set of compatible and mutually reinforcing incentives to guide economic actors' behavior.[7] Thus, institutions create better alignment of economic incentives for a particular mode of competitive economic behavior. Conversely, the logic of compensation assumes that complementarity is stronger when institutional features are based on different organizational principles.[8] Accordingly, institutions contribute to economic efficiency by offsetting each other's weaknesses. Our findings regarding firm heterogeneity suggest that these competing logics work in different ways for different kinds of economic agents. In particular, while small firms and labor-intensive firms benefit more from the logic of reinforcement, large firms and capital-intensive firms benefit more from the logic of compensation. A key finding is that both logics contain elements of truth; however, they are limited to specific segments of the economy.

Theoretical framework

In building a theoretical basis for our firm-centric analysis, we relied on the insights from the Varieties of Capitalism (VOC).[9] Although there are alternative theoretical models of capitalism, such as the National Business Systems (NBS) model and the Varieties of Institutional Systems (VIS), which offer somewhat richer, though much more complex conceptions of capitalism through their coverage of a broader range of institutional dimensions and presentation of a larger number of typologies than VOC,[10] they do not assign the same analytical weight to the firm as VOC in conceptualizing institutional complementarity. This makes VOC better suited to the type of analysis that we set out to conduct.

We adopt two premises from the VOC framework as our starting points. First, firms are the central agents in theorizing the economic impact of institutional

6 Campbell (2011); Crouch (2005a, 2010).

7 Amable (2003); Hall and Gingerich (2004, 2009); Jones and Rhodes (2006).

8 Akkermans et al. (2009); Campbell and Pedersen (2007); Campbell (2011); Crouch (2005a, 2010); Kenworthy (2006); Schneider et al. (2010); Schneider and Paunescu (2012); Taylor (2004); Witt and Jackson (2016).

9 Hall and Soskice (2001).

10 Fainshmidt et al. (2018); Hotho, 2014; Whitley (1998); See Fainshmidt et al. (2018) for a succinct comparison of these models. While VOC looks at four institutional dimensions, NBS and VIS focus on nine and thirteen different dimensions, respectively. As a result, NBS and VIS offer six and seven different types of capitalism, whereas VOC offers two.

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complementarity, in that, firms' response to the incentives and constraints presented by their institutional environment is key to understanding how the economic impact of institutional complementarity arises. Second, the core problem of economic activity in a national political economy is how to coordinate firms' productive endeavor with other economic actors located in different economic spheres, who own the economic assets that firms need, such as finance, skills, and technology. This is a core problem because the efficient allocation and use of economic resources require some degree of successful coordination among economic actors. Building on these ideas, most studies hint at the following firm performance function:

$$\Pi = f(C, X) = f(c_1, \ldots c_n, x_1, \ldots x_n),$$

where Π is some measure of firm performance, C is a vector of the coordination variables reflecting the prevalent modes of coordination in n spheres of the economy where firms' productive endeavor occurs, and X is a vector of the exogenous variables. Here, the coordination variables tap the functional benefits, or efficiency gains, of solving the coordination problem in different economic spheres.

Institutions become relevant in resolving the coordination problem. The notion of institutional complementarity suggests that addressing this problem hinges on the interaction or interconnectedness of institutions across multiple economic spheres and, specifically, the types of economic coordination supported by institutional features in economic spheres. Two alternative modes of coordination are commonly identified: market and strategic coordination. Most eloquently presented in the VOC literature, the former involves firms' interaction with other economic actors via arm's-length relations, formal contracting, and price signals, while the latter comprises firms' engagement in collaboration, collective deliberation, and credible commitment with other actors.[11] Figure 1 lays out institutional features that can support these modes of coordination in some key economic spheres discussed in the literature, such as corporate governance, labor relations, education and training, and interfirm relations, along with their incentivizing effects for particular competitive strategies.

Institutions can conceivably support similar or different modes of coordination across multiple economic spheres. Scholars differ markedly in terms of what this means for economic performance. Specifically, they present two competing logics of complementarity, yielding opposite predictions in terms of the degree

11 Hall and Gingerich (2009), 452.

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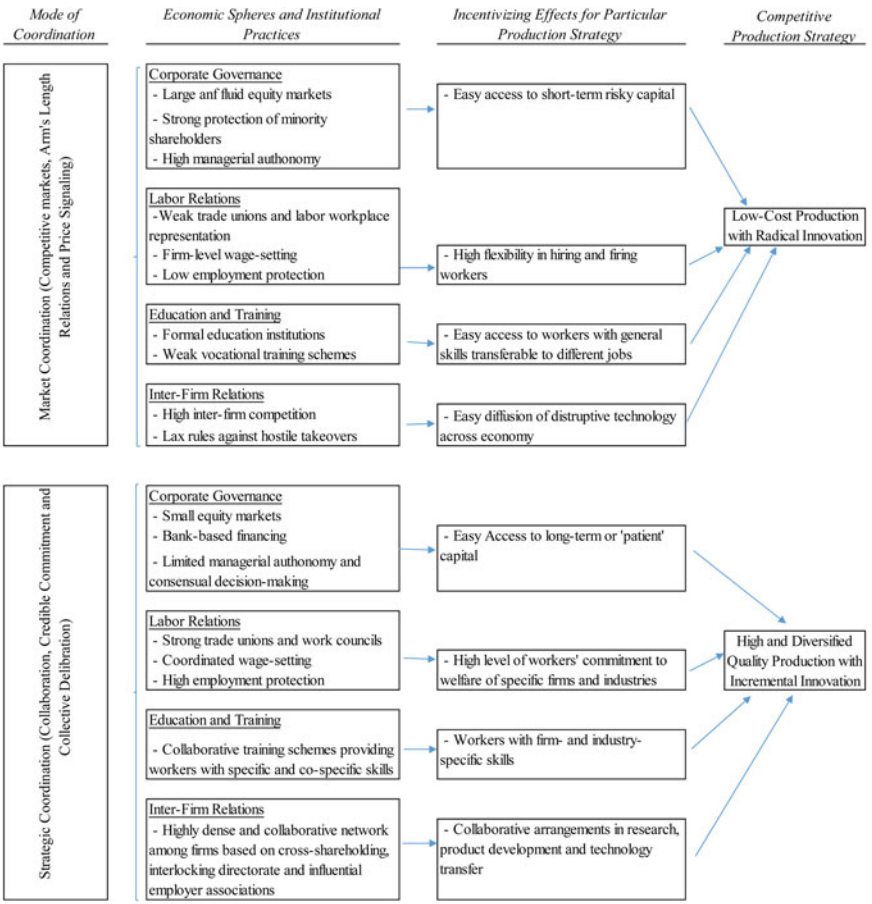

Figure 1: Modes of Economic Coordination

of analogy of the modes of coordination across different economic spheres, on the one hand, and economic performance, on the other: the logic of reinforcement and the logic of compensation.[12]

Logic of reinforcement

According to the logic of reinforcement, institutional complementarity arises when institutional features in multiple economic spheres support an analogous mode of

12 Crouch (2005b); Campbell (2011).

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economic coordination—either strategic or market. This analogy ensures that firms face a set of comparable and mutually supportive economic incentives from their institutional environment and, hence, grants firms greater capacity to pursue a particular form of competitive economic behavior.[13] Otherwise, faced with competing incentives that encourage different forms of economic behavior, firms' competitiveness diminishes. For example, as figure 1 illustrates, market coordination tends to incentivize firms to pursue a price-sensitive production strategy that emphasizes cost efficiency. Firms have stronger incentives and, hence, greater capacity to pursue this strategy if this mode of coordination is prevalent in a larger number of economic spheres. Noteworthy here are the spheres of corporate governance and labor relations. Large equity markets, strong protection of minority shareholders, and high managerial autonomy (indicative of market coordination in the sphere of corporate governance) incentivize firms to pursue the price-sensitive production strategy because of the ease of accessing short-term risky capital.[14] Similarly, weak trade unions and labor workplace representation, firm-level wage-setting, and low employment protection (indicative of market coordination in the sphere of labor relations) also encourage firms to pursue the price-sensitive strategy because flexibility in the hiring and firing of workers allows firms cost-efficient access to labor. The logic of reinforcement postulates that the incentive for firms to pursue the price-sensitive strategy is stronger when market coordination is *simultaneously* present in both corporate governance and labor relations than when it is present in one sphere alone. Stronger alignment of incentives in the former case increases firms' capacity to pursue the price-sensitive strategy, consequently enhancing their competitiveness.

Conversely, strategic coordination tends to encourage a diversified quality production strategy that emphasizes quality considerations. For example, as figure 1 illustrates, small equity markets and bank financing, limited managerial autonomy, and consensual decision-making (indicative of strategic coordination in the sphere of corporate governance) incentivize firms to pursue the diversified quality strategy because they allow greater access to long-term "patient" capital. Likewise, strong unions and work councils, coordinated wage-setting, and high employment protection (indicative of strategic coordination in the sphere of labor relations) incentivize firms to pursue the diversified quality strategy

13 Amable (2003), 60; Hall and Gingerich (2009), 470.

14 This is also because institutional investors, who do not typically own large stakes in the companies that they have invested in, have a weaker incentive to closely monitor long-term developments in firms. Instead, they focus on short-term financial outcomes, potentially making it more likely that they will favor firms that focus on producing standardized goods and services that compete mainly on price.

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because they ensure a high level of worker commitment to the welfare of specific firms and industries. It is not difficult to see why the incentive to pursue the diversified quality strategy is stronger when strategic coordination prevails in both spheres rather than in one sphere alone. Again, stronger alignment of mutually compatible incentives in the former case increases firms' capacity to pursue this strategy, thereby contributing to their competitiveness.

What happens when alternative modes of coordination prevail in both spheres? The logic of reinforcement posits that the result is suboptimal. This is because the economic incentives from the alternative modes of coordination are at variance, preventing the consistent pursuit of a competitive firm strategy (e.g., either the price-sensitive or diversified quality strategy) and inhibiting economic competitiveness. For example, take the cases of market coordination in labor relations and strategic coordination in corporate governance. While strategic coordination in corporate governance encourages firms to pursue the diversified quality strategy, market coordination in labor relations discourages them from doing so by reducing workers' commitment to the long-term welfare of firms (a facilitator of the diversified quality strategy). In the same vein, while market coordination in labor relations incentivizes firms to pursue the price-sensitive strategy, strategic coordination in corporate governance works against pursuing this strategy by reducing accessibility to short-term risky capital (an enabler of the price-sensitive strategy).

Overall, the logic of reinforcement leads to the prediction that greater institutional homogeneity, or the coexistence of institutions supporting analogous modes of coordination across economic spheres, leads to stronger economic performance. More specifically, the logic yields the following hypothesis:

Hypothesis (1): Firm performance is stronger under institutional homogeneity than under institutional heterogeneity.

Logic of compensation

The aggregate-level evidence that bears on the validity of the logic of reinforcement is not always unequivocal. Kenworthy, for example, reports that countries with more homogenous institutions perform no better than those with more heterogeneous institutions.[15] This finding was based on an examination of economic and employment growth in eighteen OECD countries over the period 1974–2000. The

15 Kenworthy (2006).

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evidence has motivated analysts to ask whether institutionally mixed economies have their own way of promoting efficiency, consequently developing an alternative logic of complementarity: the logic of compensation.

Different from the logic of reinforcement, the logic of compensation highlights that institutions contribute to economic efficiency by offsetting each other's weaknesses, specifically the functional benefits of having alternative modes of economic coordination in multiple economic spheres and, hence, having institutions supporting them.[16] The key premise is that each mode of economic coordination has its own advantages and disadvantages. Market coordination has the advantage of being flexible, or capable of easy adjustment in capital, labor, and technology, as well as being cost efficient. For example, large equity markets make it easy to access cheap and short-term capital, as well as to change capital composition; weak trade unions and firm-level wage-setting help firms to easily hire and fire workers; formal education institutions facilitate access to workers with general skills that are transferable to different jobs; and high inter-firm competition and lax rules against hostile takeovers ensure that cost-efficient technologies can easily diffuse across the economy. However, market coordination has the disadvantage of short-sightedness. For example, weak employment protection makes the workforce more concerned with the short-term welfare of firms; lack of patient capital makes managers more concerned with the current state of a firm than its long-term prospects. The resulting short-sightedness can lead to missed opportunities that, if pursued, could potentially enhance the long-term prospects of firms.

However, strategic coordination has the advantage of being long-sighted and paying greater attention to product quality. Durable ties between firms and banks allow firms to access "patient" capital, creating breathing room for a focus on long-term prospects and product quality; strong unions, work councils, and high employment protection create a workforce committed to the long-term investment of firms in quality and diverse products; collaborative training schemes provide workers with firm- and industry-specific skills, facilitating investment in quality improvement; and highly dense and collaborative networks among firms, based on cross-shareholding and influential employer associations, protect firms against hostile takeovers and allow them to focus on the long-term objective of improving quality. However, the advantage of long-sightedness and product quality comes at the expense of being inflexible. For example, durable ties between firms and banks, strong unions and employment protection, and heavy investment in firm- and industry-specific skills limit the capacity to make adjustments in factor composition if needed.

16 Crouch (2005a, 2005b); Boyer (2005a, 2005b); Deeg (2007); Witt and Jackson (2016).

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The logic of compensation posits that exposure to too much of either mode of economic coordination can hurt firm performance because the disadvantage of a particular mode of economic coordination can more than offset its advantage. As a result, firms have higher economic competitiveness if they operate in an institutional environment that supports alternative modes of coordination in different economic spheres, such that the advantage of a particular mode of coordination in a given economic sphere can be reaped while its disadvantage is mitigated by the alternative mode of coordination in another economic sphere.

Note that the logic of compensation can work when firms are exposed to institutional differences not only *within* a country but also *across* countries. Referenced in debates on institutional arbitrage, scholars have claimed that firms can display a tendency to strategically locate their operations and move across national political economies to take advantage of different institutional configurations.[17] For example, a German pharmaceutical company can do in liberal market economies what it cannot do at home by allocating its biotechnology activities in the UK or the United States and taking advantage of the local institutional framework. Regardless of whether institutional differences are within or across countries, the key point is that firms reap functional benefits from exposure to mixed institutional settings.

As a result, the logic of compensation yields the following hypothesis:

Hypothesis (2): Firm performance is stronger in institutionally mixed economies than in economies with institutional homogeneity.

As in the logic of reinforcement, the evidence presented to illustrate the logic of compensation is country- or industry-specific. For example, Campbell and Pedersen show that a shift from institutional homogeneity to institutional heterogeneity produced stronger economic performance in Denmark.[18] They report that Denmark introduced greater market coordination in the areas of labor relations, further facilitating hiring and firing. However, the country successfully blended this with strategic coordination in other areas in the form of welfare, training, and job relocation programs. This resulted in "flexicurity" institutions that yielded stronger economic performance, as market coordination and strategic coordination offset each other's weaknesses. Likewise, in his analysis of the origins of the U.S. financial crisis, Campbell documents that institutional homogeneity was one of the root causes of the crisis.[19] In particular, market coordination in the financial services industry, though leading to the industry's impressive

17 Crouch et al. (2009); Hall and Soskice (2001), 57; Jackson and Deeg (2008); Thelen (2010).

18 Campbell and Pedersen (2007).

19 Campbell (2011).

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economic performance in the 1990s and early 2000s, also created excessive short-sightedness and risk-taking. The lack of institutions that could have compensated for such a deficiency, such as strategic coordination through financial sector regulations, contributed to the crisis.

Agent heterogeneity

Before moving to the empirical analysis, we shall enrich the theoretical discussion by introducing the notion of agent heterogeneity, which is largely ignored by proponents of both logics of complementarity.[20] Common to both logics of complementarity is the premise that all economic agents experience institutional complementarity more or less symmetrically, if not in exactly the same way. This potentially explains why most analysts dismiss firms in their empirical analyses, even though they assign considerable analytical weight to firms in their theoretical discussions. However, this premise is not universally accepted. Some scholars recognize, though do not rigorously test, the idea that firms can be autonomous forces rather than passive institution takers.[21] This idea opens up the theoretical possibility for agent heterogeneity or the notion that specific agent characteristics can dispose firms to benefit more or less from institutional complementarity.

Firm size is a plausible source of variation in response to institutional complementarity. There are two different, somewhat competing, expectations about the mediating role of firm size. On the one hand, smaller firms can conceivably display higher responsiveness to their institutional environment and benefit more *at the margin* from an institutional boost to their performance than larger firms, regardless of which logic of complementarity prevails. This is so for three reasons. First, larger firms exhibit greater economies of scale or a greater cost advantage due to their ability to produce more. Noteworthy, the economic impact of institutional complementarity derives from its presumed effect on economic efficiency: higher institutional complementarity, based on either reinforcement or compensation, results in greater efficiency in using economic factors and, hence, stronger economic performance. It is also commonsensical that as the scale of production or firm size grows, efficiency is likely to increase due to various reasons, such as greater specialization of economic factors and greater spread of fixed costs over units of output. Therefore, regardless of the institutional environment, larger firms tend to display greater efficiency in using their economic factors compared

20 Amable (2003), 60; Hall and Gingerich (2009); Crouch (2005a, 2005b); Boyer (2005a, 2005b); Deeg (2007); Witt and Jackson (2016).

21 Allen (2004); Crouch and Farrell (2004); Crouch (2005a).

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to smaller firms, making the institutional boost to efficiency less essential for the former than the latter. Second, as most eloquently elaborated in the transaction cost of firms,[22] larger firms can more easily internalize the costs and benefits of their economic endeavor as their organizational scope and economic resources allow them to contract in more of the economic functions that are essential for their operation. Conversely, smaller firms' limited resources in the context of internalizing the costs and benefits of their economic endeavor make them more reliant on their institutional environment than larger firms. Third, as confirmed by abundant empirical research,[23] larger firms are more likely to engage in international production and finance than smaller firms. Studies have showed that such engagement expectedly lowers firms' exposure to the constraining forces of domestic institutions.[24] By extension, greater international exposure allows larger firms to be less affected by the political and economic institutions of particular countries, to engage in institutional arbitrage, and to be more selective in creating their own institutional complementarity. When all these lines of reasoning are jointly considered, it is possible to reach the following hypothesis:

Hypothesis (3): Smaller firms show higher responsiveness to institutional complementarity than larger firms.

On the other hand, the greater tendency of larger firms to internationalize their economic endeavor can predispose them to benefit more from compensation-based complementarity than reinforcement-based complementarity. Greater engagement in international production and finance can force larger firms to operate within the different institutional settings of their multiple host countries, further leading them to tailor their economic strategies in a way that is supported by heterogeneous institutions.[25] If large firms were to choose economic strategies, parts of which need to be executed in different institutional settings, they would be more disposed to benefit from heterogeneous institutions. Thus, the following hypothesis is plausible:

Hypothesis (4): Relative to smaller firms, larger firms benefit more from compensation-based complementarity than reinforcement-based complementarity.

22 Coase (1937).
23 Wolf (1977); Fiegenbaum et al. (1997); Martin (1998); Hitt et al. (2006).
24 Morgan (2011); Fortwengel (2017).
25 Martin et al. (1998); Fortwengel (2017).

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As hinted by prior research,[26] there is another firm characteristic that can generate differentiation in firms' response to institutional complementarity: production technology and, specifically, factor composition. Institutional complementarity between specific economic spheres can variously influence the efficiency of capital and labor. It is possible to make a distinction between labor-related complementarity and capital-related complementarity. The former is embedded in the interaction between labor relations and education and training: two economic spheres, the functioning of which has the most direct bearing on labor supply and productivity. However, the latter arises from the interaction between corporate governance and interfirm relations: two economic spheres that are most directly relevant to capital supply and productivity.

If labor- and capital-related complementarities are not equally forceful or if they operate in different ways, capital- and labor-intensive firms might differ in their response to their institutional environment. Such differentiation can happen under different scenarios, depending on how acutely the disadvantages of market and strategic modes of coordination are felt in different economic spheres. For example, *ceteris paribus*, if some disadvantages of market coordination, such as short-sightedness and excessive risk-taking, were more acute in the spheres of corporate governance and interfirm relations than in those of labor relations and training and education, capital-related complementarity would require more heterogeneous institutions than labor-related complementarity, making capital-intensive firms more disposed to benefit from heterogenous institutions. Conversely, if other disadvantages of either mode of coordination (e.g., inflexibility in factor adjustment in the case of strategic coordination) were more acute in the spheres of labor relations and training and education than in those of corporate governance and interfirm relations, it would make heterogeneous institutions more essential for labor-related complementarity to materialize, thereby making labor-intensive firms more prone to benefit from heterogenous institutions. Since we have no prior theoretical reasons to expect which of these scenarios would necessarily prevail, we treat agent heterogeneity based on factor composition, as an empirical matter, and propose the following non-directional hypothesis:

Hypothesis (5): Capital- and labor-intensive firms vary in their response to their institutional environment, depending on the relative strength of capital- and labor-related complementarities.

26 Bonaccorsi and Thoma (2007); Borck (2005); Boyer (2005a); Schneider et al. (2010).

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Sample and data

Our firm-level data were derived from the Compustat Global database, covering publicly-held firms with over ninety percent of the world's market capitalization—over eighty countries—since 1989.[27] We supplemented the annual firm-level data with institutional data from Hall and Gingerich, Kenworthy,[28] and the Comparative Politics Dataset.[29] Merging these datasets yielded a sample of 14,227 firms from twenty advanced industrial democracies from 1989 to 2007.[30]

Our dependent variable was firm performance. Since the theoretical discussion emphasized the institutional impact on firms' capability of efficient utilization of their resources, either by incentivizing them to consistently pursue a particular production strategy or by inducing a beneficial constraint, and since studies have showed profitability as a strong proxy for factor efficiency,[31] we measured firm performance as *profitability*. We defined profitability as earnings *before* interest, taxes, depreciation, and amortization (EBITDA), scaled by total assets, yielding firms' returns on assets (ROA). Profitability could alternatively be specified as net income or earnings *after* interest, taxes, depreciation, and amortization, scaled by total assets. EBITDA is preferable to net income because it allows a better comparison of baseline profitability across firms, industries, and countries by eliminating the confounding effects of financial and accounting factors.[32]

An analysis of the variance in profitability demonstrated significant differences across firms, industries, and countries. The inter-class correlation coefficients (ICCs) allowed us to assess how overall profitability was divided between the firm and country levels. The statistically significant ICCs indicated that roughly 20 percent of the variance in profitability occurred across countries. The size of

27 Note that our sample consists only of publicly-listed companies. Ideally, the sample should also include non-listed companies, but the data for these companies were difficult to find, especially data needed for cross-country firm analysis, the kind we offer here. Listed companies have the advantage of possessing standardized financial statement information and consistent and comparable data.

28 Hall and Gingerich (2009); Kenworthy (2006).

29 Armingeon et al. (2010).

30 The following countries were included in our analysis, with the total number of firms in each presented in parentheses: Australia (437), Austria (105), Belgium (119), Canada (764), Denmark (160), Finland (132), France (779), Germany (771), Greece (97), Ireland (65), Italy (260), Japan (3802), Netherlands (221), New Zealand (69), Norway (153), Portugal (58), Spain (150), Sweden (314), Switzerland (204), the United Kingdom (1531), and the United States (4133).

31 Lehmann et al. (2004); Stierwald (2010); Yazdanfar (2013).

32 Note that we used a market-based measure of Tobin's Q as an indicator of firm performance. Since the results were not substantively different, we chose to report the results based on the ROA.

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Table 1: Multilevel Analysis of Firm Profitability in Advanced Industrial Economies from 1989 to 2007

Levels/Variables	Hall-Gingerich		Hicks-Kenworthy	
	Coeff	SE	Coeff	SE
Country Level				
Institutional Homogeneity	**−0.048**	**(0.050)**	**−0.047**	**(0.062)**
Capital Openness	−0.008**	(0.001)	−0.008**	(0.001)
Trade Openness	−0.001**	(0.000)	−0.001**	(0.000)
Partisanship	0.004**	(0.001)	0.004**	(0.001)
Electoral System	0.002**	(0.000)	0.002**	(0.000)
Legal Origin	−0.013	(0.016)	−0.013	(0.016)
Firm Level				
Log(Size)	0.032**	(0.000)	0.032**	(0.000)
Growth Propspect	−1.221**	(0.009)	−1.221**	(0.009)
Reduction in Country Variance Component	83%		81%	
Number of Firms	14258		14258	
Number of Countries	20		20	
Log Restricted Likelihood	86771.250		86771.283	

Notes: Dependent variable is Firm Profitability. Entries are restricted maximum-likelihood estimates with robust standard errors in parantheses. Variance components for the firm- and industry-levels are estimated, but not reported. *$p < 0.05$ and **$p < 0.01$.

the variance hinted that while country-level factors, such as political economic institutions, are important, they are not necessarily the most decisive factor in determining firms' economic behavior. Still, the ICC values testified to the significance of explicitly modeling profitability with country-level variables.

For our purpose, the most important predictor of profitability was *institutional homogeneity*, or the extent to which the institutional practices of a national political economy consistently promoted analogous modes of coordination (market or strategic) across economic spheres. Our principal measure was Hall and Gingerich's coordination index, a continuous measure, with the low end marking the prevalence of market coordination and the high end indicating the prevalence of strategic coordination.[33] This index is the product of a factor analysis of sub-indices measuring shareholder power, shareholder concentration, the size of the stock market, level of wage coordination, and labor turnover. Further details about these sub-indices are provided in the online appendix, table 2. Although Hall and Gingerich's coordination index is the most commonly used measure of institutional homogeneity, it is heavily focused on two economic spheres: corporate

33 Hall and Gingerich (2009).

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Table 2: Additional Analyses (1)

	Manufacturing			
	Sectors Only		Service Sectors Only	
	Hall-Gingerich	Hicks-Kenworthy	Hall-Gingerich	Hicks-Kenworthy
Country Level				
Institutional Homogeneity	**−0.041**	**−0.038**	**−0.037**	**−0.007**
	(0.043)	**(0.053)**	**(0.058)**	**(0.072)**
Capital Openness	−0.003*	−0.004*	−0.012**	−0.012**
	(0.002)	(0.002)	(0.002)	(0.002)
Trade Openness	−0.001**	−0.001**	0.000**	0.000**
	(0.000)	(0.000)	(0.000)	(0.000)
Partisanship	0.010**	0.010**	−0.002*	−0.002**
	(0.001)	(0.001)	(0.001)	(0.001)
Electoral System	0.002**	0.002**	0.001**	0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Legal Origin	−0.010	−0.010	−0.011	−0.012
	(0.014)	(0.014)	(0.018)	(0.018)
Firm Level				
Log(Size)	0.031**	0.031**	0.033**	0.033**
	(0.000)	(0.000)	(0.000)	(0.000)
Growth Propspect	−1.326**	−1.326**	−1.074**	−1.074**
	(0.010)	(0.010)	(0.017)	(0.017)
Reduction in Country Variance Component	88%	88%	81%	80%
Number of Firms	6835	6835	7870	7870
Number of Countries	20	20	20	20
Log Restricted Likelihood	53650.875	53650.892	35569.605	35651.736

Notes: Dependent variable is Firm Profitability. Entries are restricted maximum-likelihood estimates with robust standard errors in parantheses. Variance components for the firm- and industry-levels are estimated, but not reported. *$p < 0.05$ and **$p < 0.01$.

governance and labor relations. This raises the question of whether the index sufficiently covers institutional practices in all the relevant economic spheres.[34] Thus, we also used Hicks and Kenworthy's index,[35] a continuous measure of cooperation, with lower scores marking greater market coordination and higher scores

34 Kenworthy (2006); Hall and Gingerich's (2009) discussion suggests that this limitation is not very severe. Their index is highly correlated with institutional practices in other economic spheres, suggesting that their measure may suitably capture the level of institutional homogeneity in the overall economy.

35 Hicks and Kenworthy (1998).

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indicating greater strategic coordination. It takes into account a larger number of institutional features than the Hall–Gingerich index. To aid interpretation, we transformed the two indices. Since the lower and upper ends in both indices capture institutional homogeneity (strategic and market coordination, respectively), we took the distance from the mid-point of the respective index, with greater distances indicating greater institutional homogeneity. This transformation enabled us to not model this variable in a curvilinear fashion.[36]

Our analysis includes a number of country-level control variables. These variables tap previously reported structural and political factors to condition firm performance. Analysts have found that a country's exposure to international markets impacts the competitiveness of the business environment, thereby improving firms' economic performance.[37] Therefore, we included two indicators to tap exposure to international market forces. Capital openness was measured with the Chinn–Ito index for the degree of openness in capital account transactions,[38] with higher scores indicating greater openness to cross-border capital transactions and greater exposure to international capital markets. We also used trade openness—export plus import as a percentage of GDP—with higher scores indicating greater exposure to international market forces.

Additionally, recent research has reported that government partisanship influences firm performance via demand- and supply-side policies.[39] In particular, these studies found firm performance to be surprisingly stronger under center-left governments than under center-right governments due to the former's expansionary fiscal and monetary policies and interventionist supply-side strategies. We measured partisanship as the difference between the percentages of cabinet posts controlled by left-wing and right-wing parties in government during a given year. The measure ranged from –100 to 100, with –100 signifying full right-wing control of the government and 100 full left-wing control of the government.

Also, research on the political economy of financial and labor regulation offers ample reasons to expect that firm performance varies under different electoral systems. Studies have identified that different electoral rules lead to different corporate governance regimes and labor market practices.[40] For example, Pagano and Volpin show that electoral systems give varying levels of representation to firm

36 Our main results, available upon request, were no different when we modelled the indices in a curvilinear fashion.

37 Melitz and Trefler (2012).

38 Chinn and Ito (2008).

39 Camyar (2014); Camyar and Ulupinar (2013).

40 Pagano and Volpin (2005); Gourevitch and Shinn (2005); Suh (2012).

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stakeholders (managers, shareholders, and workers), with different preferences regarding investor and employment protection, such that investor protection is higher and employment protection lower under plurality–majoritarian rule than proportional rule.[41] They report on a corresponding difference in firm performance. To capture the impact of electoral systems, we included disproportionality, which is based on the least square index developed by Gallagher, with higher scores indicating greater plurality–majoritarian tendencies.[42]

Moreover, some studies have shown that a country's legal tradition influences firm performance via investor protection.[43] The idea is that investor protection is stronger in countries that practice common law than in those that practice civil law. That is because (A) compared to the former, the latter tend to have more extensive and intrusive government intervention into business activity, and (B) the relatively strong principles of fiduciary duty in the latter limit the permissiveness of judges in those countries in interpreting laws favorable to minority shareholders.

Needless to say, firm performance is related to general firm characteristics as well as the institutional environment. Therefore, we controlled for two of the most commonly invoked firm characteristics: *ln(Size)* (the natural logarithm of market capitalization, i.e., the shares outstanding times the closing stock price at the end of a fiscal year) captures the influence of firm size, and *Growth* (the ratio of research and development [R&D] expenses to total assets) controls for a firm's idiosyncratic growth potential.[44] The detailed descriptions, data sources, and descriptive statistics for our variables are provided in the online appendix, tables 2 and 3.

Analysis and results

The empirical models here combine information at the levels of firms (level-1), industries (level-2),[45] and countries (level-3), where firms are nested within industries, and industries are nested within country aggregates. The use of data with a

41 Pagano and Volpin (2005).

42 Gallagher (1991).

43 La Porta et al. (2002).

44 We winsorized the firm-level variables at the 1st and 99th percentiles by setting extreme values to the 1st and 99th percentile values, respectively. Also, there could be endogeneity between profitability and the firm-level controls. Therefore, we used the one-year lag values of these control variables.

45 We used the sector classification in the North American Industry Classification System (NAICS). Table 4 in the online appendix offers more details about the NAICS.

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Table 3: Additional Analyses (2)

	Excluding 2000s		Excluding 1990s		Excluding Reform Leaders		
Levels/Variables	**Hall-Gingerich**	**Hicks-Kenworthy**	**Hall-Gingerich**	**Hicks-Kenworthy**	**Hall-Gingerich**	**Hicks-Kenworthy**	**Schneider-Paunescu Measure**
Country Level							
Institutional Homogeneity	**−0.009**	**−0.058**	**0.130**	**0.157**	**−0.021**	**−0.055**	**0.000**
	(0.045)	**(0.054)**	**(0.124)**	**(0.155)**	**(0.057)**	**(0.085)**	**(0.003)**
Capital Openness	−0.007 **	−0.007 **	−0.001	−0.001	−0.006 **	−0.006 **	−0.008 **
	(0.002)	(0.002)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
Trade Openness	0.000 **	0.000 **	0.002 **	0.002 **	−0.001 **	−0.001 **	−0.001 **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partisanship	−0.004 **	−0.004 **	0.004 **	0.004 **	0.004 **	0.004 **	0.004 **
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Electoral System	0.002 **	0.002 **	−0.002 **	−0.002 **	0.002 **	0.002 **	0.002 **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Legal Origin	−0.015	−0.013	0.009	0.008	−0.019	−0.018	−0.015 **
	(0.014)	(0.014)	(0.039)	(0.040)	(0.019)	(0.019)	(0.016)
Firm Level							
Log(Size)	0.028 **	0.028 **	0.036 **	0.036 **	0.032 **	0.032 **	0.032 **
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth Propspect	−1.204 **	−1.204 **	−1.256 **	−1.256 **	−1.232 **	−1.232 **	−1.221 **
	(0.013)	(0.013)	(0.013)	(0.013)	(0.009)	(0.009)	(0.009)
Reduction in Country Variance Component	93%	90%	95%	95%	86%	88%	94%
Number of Firms	10011	10011	12040	12040	13106	13106	14258
Number of Countries	20	20	20	20	17	17	20
Log Restricted Likelihood	46649.926	46741.478	43705.251	43705.437	80367.434	80367.978	86768.073

Notes : Dependent variable is Firm Profitability. Entries are restricted maximum-likelihood estimates with robust standard errors in parantheses. Variance components for the firm- and industry-levels are estimated, but not reported. *p < 0.05 and *p < 0.01.

multilevel structure can generate a number of statistical problems, such as nonconstant variance and clustering.[46] To estimate the models here, we relied on techniques developed specifically for multilevel data structures.[47] Multilevel modeling allows for estimating varying intercepts and slopes, produces asymptotically efficient standard errors, and provides for a direct estimation of variance components at each level of the model. The models are estimated using restricted maximum likelihood estimation (REML) rather than maximum likelihood estimation (MLE). While both are asymptotically equivalent, the former is preferable, particularly in cases of small samples of level-3 units, as in our study.[48]

The modeling technique used here entailed three equations:

$$\text{Profitability}_{fij} = \beta_{0ij} + \beta_{1fij}\ln(\text{Size})_{fij} + \beta_{2j}\text{Growth Prospect}_{fij} + \varepsilon_{fij} \tag{1}$$

$$\beta_{0ij=}\pi_j + \mu_{ij} \tag{2}$$

$$\begin{aligned}\pi_j = {} & \alpha_{00} + \alpha_{01}\text{Institutional Homogenity}_j + \alpha_{02}\text{Capital Openness}_j \\ & + \alpha_{03}\text{Trade Openness}_j + \alpha_{04}\text{Partisanship}_j + \alpha_{05j}\text{Electoral System} \\ & + \alpha_{06}\text{Legal Origin}_j + \delta_{0j}\end{aligned} \tag{3}$$

Equation (1) predicts profitability with variables at the *f* firm level. The multilevel model allows the intercept in Equation (1) to randomly vary across the *i* industry level. Therefore, Equation (2) models the intercept (β_{0ij}), the variation in the average degree of profitability among firms, as a function of the industry level. Similarly, the multilevel model allows the intercept in Equation (2) to randomly vary across the *j* country level, and accordingly, Equation (3) models the intercept

46 More specifically, in such data, the intercepts may be varied across countries, and clustering can lead to inefficient standard errors. In the case of varying intercepts, the effects of the country-level variables on profitability would be biased, in that the coefficient for institutional homogeneity, for example, could be capturing both the true effect of institutional homogeneity and other country-specific effects. In the case of inefficient standard errors, the robustness of inferences would be questionable.

47 Steenbergen and Jones (2002).

48 We ran the analyses using the bootstrapping procedure to examine the robustness of the RMLE estimates. The results, available upon request, are substantively the same.

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(π_j), the variation in the average degree of profitability across industries, as a function of the country-level variables.

Table 1 presents the results for the general impact of institutional homogeneity on profitability. To recap the predictions of the two logics, while positive and significant results for institutional homogeneity would be in line with the logic of reinforcement, negative and significant results would corroborate the logic of compensation. We ran separate analyses on the two alternative measures of institutional homogeneity. The statistically insignificant coefficients in the two models point to a clear pattern that institutional homogeneity, and by extension institutional heterogeneity, does not matter in firm performance. The results contradict hypothesis 1, derived from the logic of reinforcement. This logic leads to the expectation that as the institutional practices of a national political economy consistently support higher market or higher strategic coordination across economic spheres, there is better alignment of firms' economic incentives in pursuing competitive production strategies and, consequently, stronger firm performance. The results are not in line with this expectation. Hypothesis 2, derived from the logic of compensation, does not find empirical backing either. This logic proposes that since economic performance hinges on institutions offsetting each other's shortcomings, greater institutional heterogeneity (indicated by lower scores of institutional homogeneity) should lead to stronger economic performance. The insignificant results are not consistent with this prediction.

How robust are these results? We conducted further analyses to check the stability of our results. A set of empirical models was used to test the potentially confounding effects of secular developments and economic reforms on institutional complementarity. One such secular development is deindustrialization. Discussed particularly with reference to the logic of reinforcement, some studies have argued that institutional complementarity may work in different ways, depending on the sectoral composition of an economy, due to differences in the productivity patterns of the manufacturing and service sectors.[49] If this is accurate, the recent trend of deindustrialization may confound the economic impact of institutional complementarity. We assessed this argument by testing its central premise that firms in the manufacturing and service sectors respond to their institutional environment in distinct ways. Taking the sector classification in the NAICS as the basis, we divided our samples into manufacturing and service sector firms and ran separate analyses for these sub-samples. Table 2 presents the results by sector. The coefficients for institutional homogeneity were not significant in any of the models, indicating that manufacturing and service firms do not differ significantly in their response to their institutional environment. These results suggest that the sectoral composition of an economy is not likely to be a confounding factor in our sample.

49 Blyth (2003).

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Additionally, institutional reform practices have impacted the institutional configuration of national political economies in our sample. We undertook analyses to ascertain whether the results would be any different when institutional continuity and change were explicitly taken into account. First, we divided the sample into two time periods: the 1990s and 2000s. Hall and Gingerich show that the institutional diversity and core complementarities in the political economies of our sample countries weathered institutional reforms in the 1990s.[50] However, the 2000s witnessed institutional reforms at an even greater pace and scale.[51] If institutional reforms are a confounding factor, the coefficients for the 1990s and 2000s should behave differently. Also, studies have identified Denmark, Italy, and New Zealand as reform countries whose institutional transformation has been more extensive than that of any other country.[52] We labelled these countries reform leaders and ran the analyses without them. Importantly, the Hall–Gingerich and the Hicks–Kenworthy indices are based on institutional characteristics up to the 1990s. We then used another measure derived from the classification scheme of Schneider and Paunescu,[53] which classified countries into the categories of state-dominated economies, coordinated market economies (CMEs), hybrid economies, liberal market economies (LME), and LME-like economies. The authors then observed countries' institutional configurations at five-year intervals from 1990 to 2005. A country's classification can change from one interval to another, reflecting the institutional transformation that the country underwent. For example, while the Netherlands' status was that of a coordinated economy in the 1990s, it was classified as a mixed economy in the 2000s. Using Schneider and Paunescu's data, we created an institutional homogeneity dummy, Pure Type, which was equal to 1 if a country belonged to either the liberal or coordinated category during a given interval, hence displaying greater institutional homogeneity during that interval, and 0 otherwise.[54] The strength of this measure is that it captures institutional variation within and across countries. Its weakness, however, is its dichotomous nature because, for most studies, institutional homogeneity is a matter of degree.[55]

50 Hall and Gingerich (2009), 478.

51 Baccaro and Howell (2011); Cingano et al. (2010).

52 Hall and Gingerich (2009), 471.

53 Schneider and Paunescu (2012).

54 Along with LMEs and CMEs, Schneider and Paunescu also used the categories of state-dominated economies, hybrid economies, and LME-like economies. We treated all these categories as indicators of institutional heterogeneity.

55 More details about their measurement scheme can be found in table 1 of their work (Schneider and Paunescu, 2012, 740). Additionally, when we checked the Schneider–Paunescu classification, we noted that along with Denmark, Italy, and New Zealand, three other cases

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As per table 3, the coefficients for institutional homogeneity were insignificant across all the models. There was no significant difference between the 1990s and the 2000s in terms of how institutional homogeneity related to firm profitability. Also, in the sample of countries with supposedly greater institutional continuity, the results for the two alternative measures were also insignificant. Likewise, the results remained consistent with the original analysis when we used an alternative measure of institutional homogeneity that allowed longitudinal variation in institutional configurations within countries.

Furthermore, our results might be driven by potential selection biases. Firms from some countries—the United States, the UK, and Japan in particular—are overrepresented in our sample. That is (A) because the number of publicly listed firms is higher in those countries (note that our sample includes only publicly listed firms due to limited data on private firms) and (B) because missing data on some key variables like total assets depresses the number of firms for most of the countries. The former is a serious concern, because publicly listed firms tend to face stronger pressure for profitability than private firms. As a result, we run analysis by excluding the United States, the UK, and Japan. Additionally, we separately exclude the group of countries categorized as liberal market economies where short-term pressure for profitability is usually strong due to heavy reliance on equity financing and the group of countries categorized as coordinated market economies where such pressure tends to be weak due to reliance on "patient" capital.[56] We assign our sample countries to the liberal market and coordinated market categories based on their classification in Schneider and Paunescu's scheme.[57] The results presented in table 4 are substantively in line with the original finding.

How, therefore, do we interpret these robustly insignificant results for both logics of complementarity? One plausible way is to infer that institutional complementarity does not matter at all for economic performance, and therefore, the insignificant results capture this nil effect. This inference would clearly challenge the foundational premise of the scholarship on institutional complementarity. However, before settling with this conclusion, there is a need to test the agent heterogeneity thesis. Among other things, this thesis hints that the insignificant results might be an indication of unevenness in firms' experience of institutional

(Finland, the Netherlands, and Sweden) also displayed significant variation in their institutional configurations (as evinced in their changing categorizations). We then redefined reform leaders to include these three countries and ran analyses without them. Substantively, the results were identical.

56 Hall and Gingerich (2009), 453.

57 Schneider and Paunescu (2012).

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Table 4: Additional Analyses (3)

	Excluding US, UK, and Japan		Excluding Liberal Market Economies		Excluding Coordinated Market	
Levels/Variables	**Hall-Gingerich**	**Hicks-Kenworthy**	**Hall-Gingerich**	**Hicks-Kenworthy**	**Hall-Gingerich**	**Hicks-Kenworthy**
Country Level						
Institutional Homogeneity	**−0.024**	**−0.006**	**−0.053**	**0.044**	**−0.101**	**−0.114**
	(0.048)	**(0.058)**	**(0.078)**	**(0.082)**	**(0.073)**	**(0.087)**
Capital Openness	−0.008**	−0.008**	−0.008**	−0.008**	0.002	0.002
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)
Trade Openness	0.000**	0.000	0.001**	0.001**	−0.001**	−0.001**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Partisanship	0.007**	0.007**	0.002*	0.002*	0.001*	0.001*
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Electoral System	0.000	0.000**	−0.001**	−0.001**	0.003**	0.003**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Legal Origin	−0.011	−0.010	(+)	(+)	−0.020	−0.022
	(0.016)	(0.016)			(0.022)	(0.022)
Firm Level						
Log(Size)	0.029**	0.029**	0.021**	0.021**	0.033**	0.033**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Growth Propspect	−1.102**	−1.101**	−0.720**	−0.720**	−1.251**	−1.251**
	(0.016)	(0.016)	(0.021)	(0.021)	(0.010)	(0.010)
Reduction in Country Variance Component	91%	92%	70%	69%	58%	58%
Number of Firms	8350	8350	6662	6662	12399	12399
Number of Countries	17	17	15	15	14	14
Log Restricted Likelihood	47837.78	47837.854	42995.379	42995.329	74172.299	74172.382

Notes: Dependent variable is Firm Profitability. Entries are restricted maximum-likelihood estimates with robust standard errors in parantheses. Variance components for the firm- and industry-levels are estimated, but not reported. *p < 0.05 and **p < 0.01. (+) omitted due to collinearity.

complementarity. If different subsets of firms experience institutional complementarity in different and even conflicting ways, the overall insignificant results might be reflecting that. To check the validity of this thesis, we added cross-level interaction terms to our baseline model. For firm heterogeneity to exist, we should see that firms of different sizes and factor compositions respond to their institutional environment in distinct ways. We ran interaction models with each alternative measure of institutional homogeneity.

The results in table 5 provide strong evidence to suggest that firm size modifies the economic impact of institutions. In particular, the seemingly positive impact of institutional homogeneity declines as firm size grows. In order to provide a better illustration of the substantive meaning of this result, we estimated the marginal effects of institutional homogeneity on profitability as firm size increased and used the delta method to compute the 95 percent confidence interval around these marginal effect estimates. Based on the coefficient estimates of the model using the Hall–Gingerich measure, figure 2 shows that the marginal effect of institutional homogeneity on small firms was positive. However, this effect turned negative for larger firms. These results go against our hypothesis 3—that small and large firms differ in their responsiveness to their institutional environment—and suggest that large firms are as responsive to their institutional environment as small firms. However, the results are in line with hypothesis 4, that larger firms are primed for greater benefits from institutional heterogeneity compared to smaller firms. This hypothesis is grounded in the idea that due to their greater tendency to engage in international production, larger firms tend to tailor economic strategies supported by the diverse institutional settings of their host countries and engage in institutional arbitrage. More substantively, the results show that both logics of complementarity are valid, though only for specific categories of economic agents. While the logic of reinforcement seems to work for small firms, the logic of compensation appears to favor large firms.

Similar to firm size, factor composition also matters in differentiating firms' response to their institutional environment, in line with hypothesis 5. Across the two models with the alternative measures of institutional homogeneity, the seemingly positive impact of institutional homogeneity weakens as the capital–labor ratio, or capital intensity of firms, grows. For a better illustration, figure 3 presents the marginal effects of institutional homogeneity at different levels of capital intensity using the results of the coefficient estimates in the model with the Hall–Gingerich measure. While the marginal effect of high labor intensity on firms was positive, this effect weakened as the capital intensity of firms increased. In fact, for firms with high capital intensity, the effect turned negative. More broadly, similar to the results for firm size, these results suggest that both logics of complementary hold elements of truth, though only for different categories of

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Table 5: Firm Heterogeneity

	Heterogeneity due to Firm Size		Heterogeneity due to Capital Intensity	
Levels/Variables	**Hall-Gingerich**	**Hicks-Kenworthy**	**Hall-Gingerich**	**Hicks-Kenworthy**
Country Level				
Institutional Homogeneity	0.009	0.157*	0.216**	0.006
	(0.048)	(0.062)	(0.069)	(0.084)
Capital Openness	−0.006**	−0.006**	−0.012**	−0.011**
	(0.001)	(0.001)	(0.002)	(0.002)
Trade Openness	0.000	0.000	−0.001**	−0.001**
	(0.000)	(0.000)	(0.000)	(0.000)
Partisanship	0.003**	0.003**	0.003**	0.003**
	(0.001)	(0.001)	(0.001)	(0.001)
Electoral System	0.001**	0.001**	0.001**	0.002**
	(0.000)	(0.000)	(0.000)	(0.000)
Legal Origin	−0.015	−0.014	−0.020	−0.019
	(0.014)	(0.015)	(0.021)	(0.021)
Firm Level				
Log(Size)	−0.014**	−0.006**	0.033**	0.032**
	(0.001)	(0.001)	(0.000)	(0.000)
Growth Propspect	−1.270**	−1.269**	−1.219**	−1.220**
	(0.009)	(0.009)	(0.010)	(0.010)
Log(Capital Intensity)	–	–	0.016**	−0.001
			(0.001)	(0.001)
Cross-Level Interaction				
Institutional Homogeneity * Log (Size)	**−0.006***	**−0.034****	–	–
	(0.003)	**(0.005)**		
Institutional Homogeneity * Log (Capital Intensity)	–	–	**−0.057****	**−0.009***
			(0.003)	**(0.003)**
Reduction in Country Variance Component	95%	98%	54%	54%
Number of Firms	14258	14258	13862	13862
Number of Countries	20	20	20	20
Log Restricted Likelihood	88450.81	88477.088	76690.679	76509.272

Notes: Dependent variable is Firm Profitability. Entries are restricted maximum-likelihood estimates with robust standard errors in parantheses. Variance components for the firm- and industry-levels are estimated, but not reported. *$p < 0.05$ and **$p < 0.01$.

firms, such that while institutional homogeneity works for labor-intensive firms (consistent with the logic of reinforcement), it hurts capital-intensive firms (in line with the logic of compensation). Our theoretical discussion identified possible differentiation based on factor composition but could not establish the exact

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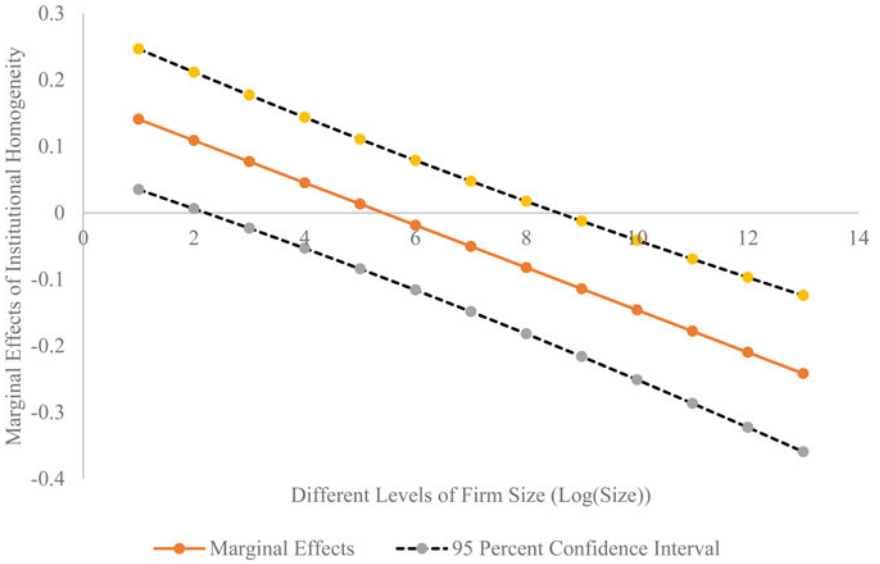

Figure 2: Marginal Effects of Institutional Homogeneity (Hicks-Gingerich) at Different Levels of Firm Size (Log(Size))

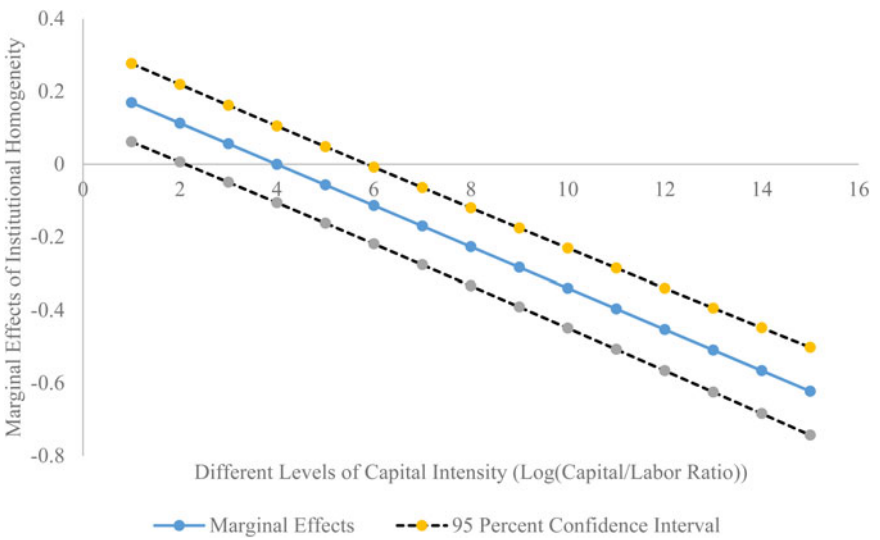

Figure 3: Marginal Effects of Institutional Homogeneity (Hall- Gingerich) at Different Levels of Capital Intensity (Capital/Labor Ratio)

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direction of such differentiation. The results suggest that the disadvantages of market and strategic modes of coordination, such as short-sightedness and excessive risk-taking, are probably more pronounced in the economic spheres that directly concern capital-related complementarity (corporate governance and interfirm relations) than in those directly related to labor-related complementarity (labor market and education and training). As a result, the realization of capital-related complementarity may require more heterogeneous institutions that can offset each other's weaknesses. This is somewhat in line with Campbell's analysis of the origin of the U.S. financial crisis, where he details how the problems of short-sightedness and excessive risk-taking of market coordination were particularly pronounced in capital-related economic spheres, spelling severe economic woes for firms in sectors, such as finance, due to the lack of strategic coordination mechanisms to counter these problems.[58]

In brief, the finding of unevenness across firms suggests that the insignificant results in our baseline model can be misleading. These results do not necessarily mean that institutional complementarity is not economically significant. In interactions with specific firm characteristics, institutional homogeneity seems to benefit certain types of firms while hurting others. Such unevenness in the experience of institutional complementarity suggests that the conflicting effects may cancel out, leading to the nil effect in our baseline model. More broadly, our results offer only partial support for both logics of complementarity and report their limited applicability to certain segments of the economy.

Conclusion

Existing studies of institutional complementary have not fully utilized the analytical leverage that the firm-level analysis offers.[59] Our research represents the most systematic application to date of cross-national firm-level data in the empirical testing of institutional complementarity. Although firms are commonly invoked in theoretical discussions of institutional complementarity,[60] there is not much usage of firm-level data in corresponding empirical assessments. The more common method of employing national- and industry-level data has significant limitations, such as boiling down to a search for correlation rather than revealing

58 Campbell (2011).

59 Amable (2000); Campbell and Pedersen (2007); Crouch (2005a); Hall and Gingerich (2004, 2009); Markus and Mendelski (2015); Kenworthy (2006).

60 Amable (2000); Hall and Gingerich (2004, 2009).

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how economic agents actually respond to their institutional environment.[61] Therefore, there is a need for more attention to firms in empirical analyses of institutional complementarity so as to gain further insights into how institutional complementarity actually arises or works at the firm level. By presenting a firm-level analysis of institutional complementarity, our study portrays a much more nuanced picture than existing studies of how institutional complementarity works. We show that both the reinforcement-based and compensation-based logics of complementarity hold elements of truth; however, it all depends on the type of economic agents. In other words, these logics do not apply equally to all economic agents, such that only certain types of economic agents stand to benefit from the logic of reinforcement, while others benefit more from the logic of compensation.

Furthermore, our empirical finding of firm heterogeneity, another key novelty of our research, helps in establishing the boundary conditions for institutional complementarity. Our results indicate that firm heterogeneity is a decisive factor in revealing these conditions. Specifically, we see that while small firms and labor-intensive firms tend to experience reinforcement-based complementarity much more forcefully, large firms and capital-intensive firms experience a boost in their performance due to compensation-based complementarity. Although institutional complementarity does not have to work in the same way at the firm and national levels, one can infer that in national political economies composed predominantly of small and labor-intensive firms, the functional benefits of reinforcement-based complementarity for aggregate economic performance are likely to be more pronounced; and in national economies populated predominantly with large and capital-intensive firms, the functional benefits of compensation-based complementarity are likely to be stronger. In that case, the finding of agent heterogeneity would have had even broader theoretical significance. While existing studies highlight the joint or interactive effects of institutions as the thrust of comparative institutional advantage, the prevalent characteristics of economic agents in a political economy should also be taken into account, as comparative institutional advantage could be based, not just on the linkages between institutional practices of different economic spheres, but also on the interaction between the institutional environment and the prevalent characteristics of economic agents. Future research can explore the implications of agent heterogeneity for comparative institutional advantage.

There are other avenues for future research. Agent heterogeneity has important implications in terms of theorizing the politics of institutional change, which can be explored in future research. Complementarity is often presented as the

61 Allen (2013), 776.

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central mechanism in explaining institutional continuity and change.[62] The assumption is that complementarity yields positive returns for economic actors, which further incentivizes them to maintain the institutional generators of this complementarity. However, if institutional complementarity is as evenly experienced as the literature suggests, it becomes difficult to identify the fault lines of political contention on institutional change. Unevenness in the experience of complementarity across economic actors, however, helps us identify those lines. In other words, it is conceivable that unevenness in the benefit of complementarity can create a corresponding difference in the level of support and opposition for institutional change. For example, if small firms and labor-intensive firms benefit more from institutional homogeneity, are they more supportive of institutional reforms that enhance institutional homogeneity? Likewise, if large firms and capital-intensive firms benefit more from institutional homogeneity, are they more in favor of institutional reforms that create hybridization of the modes of economic coordination?

Future research can also address some of the limitations of our own research. First, as noted earlier, there are alternative conceptions of capitalism other than VOC, most notably the NBS and VIS models. In offering richer, though more complex conceptions of capitalism, these models look at a broader range of institutional dimensions and formulate a larger number of capitalist typologies. VIS has the additional advantage of having stronger applicability to both developing and developed countries.[63] Due to the stronger firm-centered orientation of VOC, we selected it as our theoretical framework. However, future research needs to explore the firm-level implications of the specific institutional dimensions singled out by the alternative models and the variation of firm behavior across the various capitalist models presented by these models. Second, it would be interesting to carry out a firm-level analysis with different conceptions of institutional complementarity. For example, Hopner distinguishes between the necessary versus compatible character of institutional complementarities and highlights the possibility that institutions might be compatible, but not necessary for each other.[64] This raises the possibility of a hierarchy of institutions in terms of the importance of patterns of institutional complementarities, with the implication that firms might be performing well even if not all the usual institutional suspects are present. Third, since the prominent models of capitalism, including VOC, emphasize national-level institutions, our analysis focused on national measures of

62 Aoki (2001); Amable (2003); Crouch (2005a); Deeg (2007); Hall and Soskice (2001); Hall and Thelen (2009).

63 Fainshmidt et al. (2018).

64 Hopner (2005).

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institutions.[65] However, there could be institutional variations at the regional or sectoral level within the same national economy that could potentially confound our results. In fact, regional or sectoral-level institutions can be more relevant for individual firms than national-level institutions. Due to the lack of regional or sectoral-level quantitative indicators of institutions, we could not test this. However, if measures of sub-national institutional variation become available, future research can explore the kind of firm-level analysis conducted here, using the regional- or sectoral-level measures of institutions.

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65 Fainshmidt et al. (2018); Hall and Soskice (2001); Hotho (2014); Whitley (1998).

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