

# **Beyond legal transposition: Regulatory agencies and de facto convergence of EU rail liberalisation**

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**ABSTRACT** Notwithstanding its maturity, the literature on European Union (EU) compliance tends to overlook the implementation stages beyond the legal transposition of single-market regulatory reforms. This article explains the cross-national variation in the actual implementation of the EU regulatory reform of rail market among the EU-15. The empirical findings highlight the importance of the establishment of national regulatory agencies. Member states with an independent regulatory agency converge faster towards the EU model of liberalization. This conditional effect of EU railway harmonization is enhanced by the presence of new entrants that activate the institutional functions of national independent agencies as enforcers of EU legislation.

**KEY WORDS:** EU compliance, EU regulatory governance, *de facto* implementation, liberalization of utility markets, Rail Liberalisation Index

## INTRODUCTION

The European Commission's strategy to create a single European railway market has followed a long-lasting policy sequence. By fostering competition within domestic passenger markets by 2020, the 2013 Commission's proposal sets the final step towards complete liberalization, which has required three decades and four packages of regulatory reform. The previous experience in other network markets, in particular electricity, telecommunications and airlines, has defined the principles and elements of an open and competitive economic governance of railways (Dyrhaug 2013). The railway network of the European Union (EU) has been designed to be 'independent of national governments, with a transparent governance framework and non-discriminatory rules' (Dyrhaug 2013: 72). In April 2016, the technical pillar of the fourth reform package was adopted and, as a result, the European Union Agency for Railway (ERA) will play a greater role in ensuring the implementation and convergence towards the EU model of a fully open railway market.

The implementation of EU regulatory reform is complex. Policy actor preferences are dispersed among levels of governance, and EU decision-making is specialised by sectors and policies (Vollaard and Sindbjerg Martinsen 2014). Reform objectives are often ambiguous, allowing sufficient discretion to member states for them to delay (Kaeding 2006) and relax the legal transposition (Zhelyazkova 2013) as well as the technical harmonization (Versluis 2007) of EU single-market directives. As a result, national governments' efforts to comply with the successive steps of liberalisation towards the market opening should not be taken for granted. Indeed, several scholars have shown that the legal transposition of the EU rail policy at the national level has been uneven (Héritier, A. *et al.*; Kaeding 2006). Beyond the legal transposition, new

entrants have faced many obstacles in accessing national rail markets because of the dominant position of incumbent companies (Dyrhaug 2013: 72).

This article focuses on administrative practices necessary for the actual implementation of and the compliance with EU rail policy. In order to analyse the variation in the enforcement and monitoring of market operators (Falkner *et al.* 2005: 12, Treib 2008), the extent of access to rail markets is measured from the perspective of a new entrant in national markets (see section 4.1 for a detailed illustration of the dependent variable). Although EU compliance studies revolve around well defined theoretical arguments for explaining variation in compliance with EU legislation, the ‘law in action’ (Versluis 2007) and the implementation stages beyond the punctual and correct legal transposition of regulation have generally been overlooked (Mastenbroek 2005; Treib 2008). This is because it is often difficult to generate reliable and representative data on technical harmonization and enforcement of EU legislation at the national level. Accordingly, time-series cross-sectional analyses tend to rely on the Commission’s official statistics on notifications and infringements and, consequently, to focus on the timeliness or the correctness of transposition (Hartlapp and Falkner 2009).

EU compliance analyses are a relevant part of Europeanization studies (Saurugger 2015). Following Börzel and Risse (2000: 3), we conceptualize Europeanization as ‘a process of institution-building at the European level’ that ‘impacts upon the member states’ by inducing substantial policy change, and ultimately policy convergence, if the researcher is able to observe among EU member states an increased similarity over time (Holzinger 2006, Kahn-Nisser 2015, Paezold and Van Vliet 2014).

Building on Plümper and Schneider’s (2009) models that estimates “catching-up” convergence (see section 4.4) and probing two institutions and key principles of the EU

railway liberalization, i.e., vertical separation and independence of sectoral regulatory agencies,<sup>1</sup> we aim to contribute to the EU compliance literature by analysing *de facto* convergence, i.e. a decrease in the variation in administrative operations and regulatory enforcement practices across the fifteen ‘old’ EU member states (EU-15) over time (Figure 1). Given that the purpose of this article is to estimate the extent of rail market convergence in line with the three successive reform packages (see section 2), we include in the sample the EU-15, the only member states that have experienced the entire process of liberalization. The remaining member states have been excluded because EU accession and the *acquis communautaire* forced compliance into a much shorter time frame, making comparison with the EU-15 untenable. Furthermore, it would be hard to isolate the impact of EU accession from broader regulatory reform stemming from also the financial distress associated with the economic transition (Amos 2005), as well as from the financial intervention of the European Investment Bank and the European Bank for Reconstruction and Development (Amos 1995) occurred in Central Eastern European countries.

The long and multi-staged process of EU rail liberalization is a crucial case for testing hypotheses concerning convergence induced by EU harmonization (Holzinger and Knill 2005). Rail networks have been historically characterised by different economic governance principles, as a result an analysis of *de facto* implementation requires account to be taken of the extent of competition within national rail markets. We show that convergence towards an open European railway is conditional on the establishment at the national level of sectoral independent regulatory agencies. Furthermore, since national IRAs’ capacity of obtaining information on and monitoring the access to railway markets depends on complaints for discriminatory practices, this convergence process is enhanced by the presence of railway companies that exhort the enforcement

of railway liberalization. These findings are consistent with previous literature that shows the positive impact of independent regulatory agencies (IRAs) on the implementation of EU rail liberalization (Nash 2008; Versluis and Tarr 2013). By highlighting the role of IRAs on railway policy convergence, this paper also contributes to an emerging literature on the impact of agentification on EU compliance (García Quesada 2014), the adoption of standards (Maggetti and Gilardi 2011), and the quality of regulatory governance (Guidi 2015; Vining, Laurin and Weimer 2015).

The remainder of this paper is structured as follows. Focusing on vertical separation and independence of national regulators, the next section summarises the evolution of EU railway regulatory reform and highlights the ongoing process of convergence. Section 3 disentangles the causal factors driving convergence towards the EU economic railway governance model. Section 4 describes the data and the convergence models. Section 5 summarises the empirical analysis. Section 6 concludes by providing recommendation for regulatory reform and arguing that EU compliance studies should analyse specific policy sectors, rather than aggregate and cross-policy sectors.

## **EU RAILWAY REFORM AND THE INCOMPLETE PROCESS OF CONVERGE**

Since the beginning of the 1990s, the EU has been establishing a regulatory framework for a standardised competitive managed market within a single railway area. The aims of the EU's step-by-step regulatory reform and support-building strategy have been to increase the competitiveness of the rail transport system, and to foster a pattern of sustainable mobility.

The first step towards the creation of a Single European Railway Area was made through Directive 91/440/EEC which established the key principle of the vertical separation of accounts between the management of rail infrastructure and the provision of rail services.<sup>2</sup> National governments transposed the directive by relying on different economic governance models for ensuring the independence of infrastructure manager from rail operators. Among the EU-15, Denmark, Finland, the Netherlands, Portugal, Spain, Sweden and the UK has achieved a full institutional separation between the infrastructure manager and rail operators. Conversely, Austria, Germany and Italy have chosen a vertically-integrated model: the infrastructure manager and the incumbent rail operator are owned by a holding company purposely created for complying with the separation of accounts demanded by the directive.<sup>3</sup> Several other countries lay in between these two extremes. Belgium, France and Luxembourg have opted for an economic governance model in which the infrastructure manager is independent but delegates several functions to the state-owned incumbent (Dyrhaug 2013: 46-47; Nash 2008: 63; OECD 2013: 24).

Once established the principles of infrastructure managers' independence, the EU has pursued a gradual opening to competition and a progressive harmonization of technical and safety standards and administrative processes in order to increase the interoperability of national rail systems. Focusing on the rail freight, the first package of reform was enacted in 2001 and defined a trans-European rail freight network. To achieve a level playing field for new entrants, this package required the independence of the national authority responsible for the licensing process from the incumbent rail operator. In 2004, the second railway package increased the administrative transparency by furthering the specifications of freight railway interoperability and common safety standards, and by creating the European Railway Agency (ERA).

Beside vertical separation, the establishment of a European transnational network of regulatory agencies (comprised of the European agency, national enforcement agencies for ensuring interoperability and access to rail markets, as well as national railway safety authorities) is the other institutional innovation to reform the governance of national railways. The main function of the network of national rail agencies is to ‘monitor implementation at the domestic level’ (Versluis and Tarr 2013: 316). National regulatory agencies that are independent from both the incumbent rail company and from the political control can better ensure actual compliance at the national level with the full competition model designed in Brussels. In not vertically separated systems, ‘railway regulator is in conflict with the incumbents and its main role is to support new entrants in case they feel discriminated against’ (Finger and Messulam 2015: 16).

The existence of a politically independent regulatory agency is not, though, a result of the transposition process: ‘Directive 2001/14 specifically permits the regulatory function to be located within the Ministry, provided that it is independent from any “infrastructure manager, charging body, allocation body or applicant”. Thus independence from political control is not required’ (Nash 2008: 65).<sup>4</sup>

The regulatory reforms of freight rail paved the way for the third reform package, concerning the passenger market. The 2007 package established the service quality standard and the certification of train drivers operating within the EU, and introduced open access rights for international rail passenger services. Since 2010, cross-border rail passenger transport has been officially liberalised for all EU countries. International railway companies are now allowed to pick up national traffic in a country and drop the same passengers on a further stop in the same country before crossing borders.

In April 2016, the European Parliament approved the technical pillar of the fourth railway package. This regulatory reform aims at harmonizing the administrative processes concerning rail operators and rolling stock manufacturers. Acting as a one-stop shop, the ERA will be empowered to issue market vehicle authorisations and safety certifications. The inter-institutional negotiations with the European Parliament and Council on the remaining pillars of governance and market opening are currently ongoing.

Plotting an index of *de facto* access to national rail markets (see section 4.1), Figure 1 shows there has been an incomplete convergence towards the final equilibrium of the fully liberalised and harmonised model. In 2011, the index still varies between 481 and 850. Nonetheless, the process of convergence toward open railway markets is occurring, notably between 2007 and 2011, despite the fact that each package of regulatory reform demanded from member states considerable regulatory adjustments. The question is, then, whether vertical separation and the establishment of national regulatory agencies independent from the political control have influenced the speed and scope of catching-up convergence.

[Figure 1 about here]

## **EXPLAINING CONVERGENCE BEYOND LEGAL TRANSPOSITION**

Ensuring a level playing field for rail companies in the European single market requires compliance with technical standards and market access conditions through the administrative operations and enforcement at the national level of common regulatory standards (IBM 2011). The extent of vertical separation between infrastructure manager and rail incumbent can be regarded as an important driving factor for advancing the



process of liberalization (OECD 2012) and accelerating convergence, so that countries with a low level easiness to access their national railway markets show larger liberalization measures.

We propose an alternative and nuanced explanation that refers to the institutional solution of national IRAs. Regulatory agencies that are independent from the political control and situated outside the ministry of transport can ensure an effective monitoring of compliance with liberalization measures. Furthermore, the EU network of national agencies brings about reputational costs and financial sanctions that in turn can outweigh the eventual gains obtained from non-compliance. This institutional variable can influence the speed of convergence, especially among countries that are lagging behind in the actual implementation of EU rail liberalization.

IRAs are however not operating in an economic-political void. Therefore the presence of new entrants in national markets, the extent of institutional veto players and the density of trade unions are the other variables to take into account in order to explain convergence. The following subsections illustrate each of these determinants of convergence, arguing that the institutional and economic governance accounts need to be integrated in order to explain the convergence of railway reform among the EU-15.

### **The conditional effect of national regulatory agencies**

Although the implementation of EU legislation lies with the member states, networks of national IRAs can be the solution to the lack of regulatory harmonization in a multi-level context (Hobolth and Sindbjerg Martinsen 2013; Jensen 2007). Within the transgovernmental network concerning the EU rail area, the ERA has the potential to play several roles in order to enhance compliance (Versluis and Tarr 2013). From the

enforcement perspective, the ERA examines the transposition of several directives and has carried out cross-auditing pilots (Versluis and Tarr 2013). However, unlike other transport agencies it has no competence to inspect national authorities (Groenleer, Kaeding and Versluis 2010; Versluis and Tarr 2013: 324). From the perspective of administrative capacity, the ERA can facilitate strategies of administrative capacity building across national regulatory authorities by explaining and training on interoperability and safety standards. Finally, by exchanging best practices and disseminating information, the ERA can be perceived as a teacher of norms (Versluis and Tarr 2013). Accordingly, we expect the ERA and its network of national agencies to influence the speed of adjustment and the degree of policy change of member states.

However, these roles can be played by the ERA only if national agencies are in place. Only national and independent agencies can effectively ensure the fulfilment of liberalization objectives through the progressive implementation and enforcement of measures designed to ensure competitiveness and openness in national rail markets. In other words, because the function of IRAs is to depoliticise decision-making concerning the governance of utility markets (Majone 1994), independence from the incumbent operator and from political control is crucial for achieving the goals of the regulatory reform promoted by the EU but implemented at the national level (Thatcher 2002). Accordingly, an IRA tends to guarantee non-discriminatory market access for new entrants and to enhance the transparency of decisions concerning rail operator licences and safety standards. It also regulates infrastructure allocation procedures, supervises access fee costs, oversees disputes concerning train path allocations, and monitors the extent competition (Finger and Messulam 2015, IBM 2011).

Convergence towards the EU model requires that national rail markets be constantly adjusted to eventually meet the requirements of the EU reform packages. The political institutional capacity for regulatory reform depends on the institutional arrangements and is a moderating factor that partly explains the variation in countries' responses to Europeanisation (Schmidt 2002: 898). As regulatory enforcers, national IRAs are the institutions responsible for ensuring the actual implementation of EU regulatory reform, and so play an essential role in *de facto* administrative operations and regulatory enforcement (García Quesada 2014).

### **The fit with railway economic governance and the role of veto players**

The objective of EU railway reform is to increase the competitiveness of the railways. A previous comparative qualitative analysis of the implementation of the first directive (91/440/EEC) in Germany, the Netherlands and the UK emphasised the importance of the EU reform for providing solutions and legitimacy to national policy champions, as well as strategic opportunities to counter the opponents of liberalization (Knill and Lehmkuhl 2000). The promotion of these solutions and opportunities is facilitated by the extent of the fit between the European regulatory model and a given country's 'policy legacies' (Schmidt 2002) and the structure of national economic governance of the railway. Economic governance reforms are locked into path-dependent policy preferences, because 'established railway actors have a vested interest in retaining the status quo rather than accepting competition, which could lead to a diminished market position, reduced relationship with the state/government or loss of employment' (Dyrhaug 2013: 12). As a result, endogenous political preferences of the EU member states are embodied in the features of economic governance of national railways.

However, the Commission's legislative efforts to open the rail market have gone through a sequence of pragmatic stages of regulatory reform with the aim of abolishing the dominant position of the public-owned incumbent as well as the barriers to market entry. The former goal has been achieved indirectly through vertical separation; the latter has been pursued by allowing the establishment of new entrants in the rail market. This strategy for regulatory reform breached the political resistance of long-established vested interests by enlarging the number of rail actors. There are two explanations of the positive impact of new private entrants on market access. Firstly, instead of complaining to Directorate General Competition for abuse of dominant position by rail incumbents,<sup>5</sup> new entrants have relied on national IRAs and competition authorities to demand non-discriminatory access conditions and consequently the *de facto* compliance with EU rail directives. Indeed, an IRA can enhance the transparency administrative procedure by obtaining information from the railway infrastructure managers. 'However, neither Article 30(4) nor Article 10(7) of Directive 91/440 on the development of the Community's railways requires that the regulatory body has powers to obtain information in the absence of any complaint or suspicion of infringement of those directives or that imposes penalties in the event of any infringement' (Case C 556/10 European Commission v Federal Republic of Germany). In other words, an IRA can enhance administrative transparency only when a new entrant activates a 'complaint and correction' process (European Rail Freight Association 2014: 3). Secondly, new entrants can pursue lobbying activities towards national regulatory authorities in order to obtain a better access to the national railway network (Dyrhaug 2013: 74-5). All in all, 'administrative practices can be brought into line when citizens and businesses find it expedient to use the internal market' (Hobolth and Sindbjerg Martinsen 2013: 1411). Accordingly, we expect a positive association between the

number of railway operators and further administrative measures for enhancing market access.

Beside the goodness of the economic governance fit, ‘variations in national institutional opportunity structures’ may constrain a given country’s adjustment towards the EU model (Haverland 2000: 85, see also Schmidt 2002). Although European legal requirements cannot be ultimately disregarded, the extensiveness of domestic institutional veto points may delay the process of *de facto* convergence. Accordingly, we expect a negative association between the number of institutional veto players and further measures for liberalising rail markets. In this specific case of railway reform, a better operationalization of institution opportunity structures is the extent of trade union density. Although marginalized in the EU railway policy process, trade unions have been an influential interest group at the national level (Dyrhaug 2013: 70, Heritier *et al.* 2001). Through worker mobilization and the framing of railway as a public service, national trade unions have been usually opposing to the EU drive for liberalization (Connolly and Darlington 2012, Heritier *et al.* 2001). Accordingly, the *de facto* implementation of market liberalization may be relaxed in countries where trade unions are large and organized, especially in railway that is traditionally a highly unionized sector.<sup>6</sup>

## **OPERATIONALISATION, DATA AND METHOD**

### **Access Index**

Since 2002, the IBM Global Business Service has been gathering data in order to compare the extent of rail market openness in Europe. The dependent variable captures the changes of the Access index, a sub-index of the so-called Rail Liberalisation (LIB)

Index (IBM 2011). The Access index does not weigh market openness in absolute terms.<sup>7</sup> Instead, it gauges the compatibility of national liberalization measures with the provisions for the EU single railway market (IBM 2011: 16, 20). Specifically, the Access index compares the ease of market entry, looking at the time and costs necessary for a railway company which intends to enter a market as a newcomer to acquire licences and to operate.<sup>8</sup>

The Access index varies between 0 and 1000 (high scores represent lower *de facto* barriers in a given country) and has four editions (2002, 2004, 2007 and 2011). The first three editions are in concomitance with the EU reform packages. Accordingly, the index is dynamic and displays the actual changes in administrative and enforcement practices across EU member states in accordance with the changes in EU rail legislation. Although the Access index questionnaire distinguishes between the access requirements for rail passenger and freight transport, this separation is applied only at the level of the overall LIB index and not at the level of Access index.<sup>9</sup> The data used for the empirical analysis have been downloaded from the CESifo Group dataset website.<sup>10</sup>

### **Convergence, regulatory agencies and vertical separation**

The lagged level of the change in rail market access in a given country has been included in order to examine whether convergence occurs. A negative and significant coefficient of the (beta) convergence variable would indicate a process of adjustments wherein countries with lower level of compliance with market access tend over time to liberalise more. Turning to explanatory variables, all of them have been observed one year before the years of observation (2003, 2006 and 2010) in order to take into account problems of endogeneity. A dummy variable captures whether a given country has

established ownership or legal separation. This variable relies on the OECD indicators of regulation in energy, transport and communications (ETCR) that measure the extent of regulatory reform between 1975 and 2013. The dummy variable assumes value 1 when the score of the ETCR “vertical integration” variable equals 0 (attested to ownership separation) or 3 (attested to legal separation), and value 0 in the case of accounting separation. Another dummy variable captures whether a country has chosen a full institutional separation (Nash 2008 and Dyrhaug 2013, and see Section 2). We also include a dummy variable that equals 1 when a given country established an IRA. With the exclusion of Ireland, the Online Appendix, available on the Taylor & Francis website, shows that there is a great variance in the timing of establishing a regulatory body independent from the political control.

By interacting these dummy variables with the lagged level of the dependent variable, we can assess the effect of vertical separation and regulatory agencies on the rate of convergence (see Equation 2). We also expect that IRA is the institutional solution that would allow countries with low level of access to catch up with the *de facto* compliance.

### **Rail market structure and veto players index**

The constraining effect of the economic governance misfit has been taken into account by including another index of the ETCR dataset. Specifically, we rely on the ‘Market Structure’ score, which varies between 0 and 6 (the lower scores indicate a high level of competition among rail operators). This score is composed of two items, one

concerning the number of operators that compete in the passenger transport market, and the other the freight transport market.

We also include in the model a veto player index, by using the revised version of Tsebelis's index proposed by Jahn *et al.* (2014). This index comprises a time-variant veto player preference and includes information on institutional settings, such as a second chamber and a president of the executive, that are 'anticipate veto players'. Finally, the measure of the trade union density, that is the proportion in percentage of employees in union, is an appropriate measure of representativeness for conducting a comparative analysis (Eurofound 2008), and is taken from Visser's (2013) dataset on institutional characteristics of trade unions, wage setting, state intervention and social pacts. The Online Appendix presents the descriptive statistics of the dependent, convergence and independent variables.

## **METHODS**

Following Plümper and Schneider's (2009) models (formally presented in the Online Appendix), the estimation of beta-convergence proceeds in two steps: first we test the basic convergence model with control variables in order to ascertain the existence of convergence toward a equilibrium value (Schuster, Schmitt and Trau 2013); then we analyse the effect of vertical separation and IRAs on the speed of convergence.

Panel datasets are highly at risk of correlated errors and violation of the assumption of the independence across observations, leading to biased estimates and misleading significance tests. According to the literature on panel datasets with ordinal dependent variables, we opted to apply the robust standard error procedure to address correlated and non-identically distributed errors in the analysis (Huber 1967; Beck 2008).



## EMPIRICAL ANALYSIS AND FINDINGS

Table 1 summarizes the statistical results of the convergence regression models. In most of the models, the coefficient of the lagged dependent variables is negative and statistically significant, indicating a general trend of catching-up convergence among the EU-15; a trend in which the lower the Access index in  $t-1$ , the higher the rate of adjustment and compliance with EU directive. This trend is attested in Model 1, the basic model only with control variables of market structure, veto players and trade union density that shows a decent fit of the convergence model in explaining the variation of changes in rail market access. It is important to note the large and highly significant impact of the market structure score. Whereas veto players have no effect on convergence towards EU railway liberalization and trade union density is significant at the level  $p < 0.10$  but in the opposite direction. Countries with large trade union density tend to have large adjustments in the *de facto* liberalization. However, this finding is not surprising. Previous comparative qualitative analyses of the legal implementation of directive 91/440/EEC showed how the trade unions' opposition to EU railway liberalization model resulted in national policymakers enacting gold-plating measures (Héritier *et al.* 2001). Specifically, two mechanisms explained this causal effect. Granted their ideological opposition to market liberalization and pursuit of a policy framing of railway as a public service, trade unions have two strategic choices. Trade unions may take a pragmatic approach by directing their mobilization efforts to the protection of workers' welfare and salary conditions (Eurofond 2012: 39-40). In order to achieve such results and being involved in the policy-making process, large trade unions may be willing to accommodate further liberalization of railway such as in the case of Germany (Teutsch 2001). Alternatively, trade unions may mobilize against the EU model of market and rail liberalization. But instead of constraining

liberalization measures, such a mobilization expedites the liberalization process. This occurred in France, where the strikes against directive 91/440/EEC maintained the liberalization issue in the political agenda. While politicians opposed to liberalization at the EU level, the national level policy was dominated by technical experts and sectorial civil servants who internalized and endorsed the European logic of market competitiveness (Douillet and Lehmkuhl 2001). The combination of both mechanisms may exist in the actual implementation of rail access since the technical nature of the issue.

[Table 1 about here]

This basic model only assesses whether the EU-15 are railway regulatory reform has experience a process of convergence among countries, without specifying which institution-dependent explanation increases the speed of adjustment towards of laggard countries. Accordingly, Model 2 and 3 summarize the results of convergence regressions where the presence of vertical separation and the presence of an IRA are ‘a structural factor influencing the rate of adjustment’ (Plümper and Schneider 2009: 1003) towards the EU railway model.

Does the convergence of rail liberalization policy depend on the vertical separation or on the presence of an IRA? Relying on the OECD data, Model 2A and 2B attests that vertical separation had a positive influence on the extent of regulatory change and facilitated market access for new entrants. Both the coefficients of the dummy variable and the interaction term are considerable, statistically significant and in the predicted direction. However, since the coefficient of the convergence variable is not statistically significant, these models do not capture the catching process evidenced by Figure 1 and the basic model of convergence. In other words, vertical separation is not an

institutional solution that allows lagging behind countries to speed up in opening access to rail markets. Indeed, it is a prerequisite common in all EU-15 for sustaining market liberalisation. We also controlled the conditional model of convergence according to the group of countries with full institutional separation (Model 2 C). This model with a static dummy variable shows that, although the convergence coefficient is negative and statistically significant, the interaction term is close to zero, not influencing the extent of policy change, and not statistically significant. Overall the two measures of vertical separation are ineffective in capturing the convergence process depicted in Figure 1 and in the Model 1. <sup>11</sup>

Conversely, according to the regression results reported in Model 3, IRAs have a strong impact on the adjustment speed. The coefficient of the lagged level of market access and the coefficient of the interaction variable are both negative and statistically significant. This means that IRAs speed up the degree of change in EU rail liberalisation. This effect is even stronger when we consider the trade union as control variable: The effect of IRAs on convergence is represented by the difference between the value -0.59 of the  $\beta_0$  coefficient for countries with no IRAs and the value -0.92 of the  $\beta_2$  coefficient for countries with IRAs. Indeed, the effect of IRAs is given by  $-0.59 + (-0.33) = -0.92$ . In other words, the change of the degree of convergence to rail liberalisation is faster in those countries where an IRAs has been established before the introduction of the EU reform packages. This conditional effect of IRAs can be explained also by looking at Figure 1 showing that the degree of variation among countries decreased notably between with the last two reform packages, in concomitance with the fact that most of EU-15 countries have established an IRA.

The impact of the rail market structure on the extent of change towards rail market access is remarkable and confirms the hypothesis that the presence of various rail companies pushes for further liberalization. This finding requires several qualitative evidences for further explaining the mechanisms of this causal relationship.<sup>12</sup> For instance, in 2009 a French new entrant complained to the national competition authority that the *Société nationale des chemins de fer français* (SNCF) made use of competitors' 'confidential information obtained within the framework of its public infrastructure-management mission' to adapt the commercial strategy of SNCF freight branch (OECD 2013: 99). More recently, the complaint and correction process has engaged the French sectoral IRA that instructed the infrastructure manager to improve the process for allocating freight train paths (Barrow 2013).

Since the 2000 liberalisation of the national passenger rail market, the Italian competition authority had been active in investigating and ascertaining abuses of dominant position by the Italian State infrastructure manager (*Ferrovie dello Stato*, FS) and its subsidiary rail service provider *Trenitalia*. In particular, a new entrant, *Nuovo Trasporto Viaggiatori*, brought a case against FS 'alleging that the company was favouring the incumbent railway in the provision of access to its infrastructure, even before launching its passenger services' (OECD 2013: 28). Other complains regarded the practices of *Trenitalia* to overlap with the competitors' services, by increasing and modifying train routes and frequencies, as well as the delay in dealing with the competitor's request for track allocations and unjustified obstacles to access stations services (OECD 2013: 130-1). This complaint activity induced *FS* to pledge to improve market access for the incumbents (Chiandoni 2013).

## **CONCLUSION**

Looking at the national administrative implementation and enforcement of EU rail liberalization, our empirical analysis shows that there is an ongoing process of convergence across the EU-15. While quantitative analyses of EU compliance are mainly focused on legal transposition across several policy domains, we have argued for a sector-specific focus on economic governance institutions such as vertical separation and IRAs. Relying on a similar institutional approach to Europeanization, we found that in Europe there is much less differential implementation as maintained by Héritier *et al.* (2001) in their analysis of the legal transposition of directive 91/440/EEC. We show that the process of *de facto* convergence of EU-15 railways has been facilitated by the presence of IRAs. IRAs are an essential condition for EU regulatory networks to exert normative, socialisation and learning effects, in order to achieve compliance and harmonization. Contrarily to vertical separation, our convergence models show that national IRAs are a structural factor of catching-up process of convergence.

Qualitative evidence attests that national IRAs facilitate and implement further market liberalization mainly if they are asked to do so by new rail entrants that are competing with market incumbents usually a previously public monopoly provider. In other words, the rail market structure is a factor driving convergence that enhances the conditional effect of the establishment at the national level of an IRA. Contrarily to the conventional wisdom, trade union density is associated with changes toward a more open rail market. The relevance of these variables is another reason to argue for sector-specific analyses of the extent of compliance.

This paper has also provided a contribution to the literature on the cross-sectional variation in the impact of regulatory agencies on policy objectives and outcome. With

few exceptions (García Quesada 2014; Guidi 2015; Vining, Laurin and Weimer 2015), our understanding of the role of IRAs is surprisingly limited to the explanations of and conditions for adopting and institutionalising IRAs. Focusing on national IRAs as the enforcers of EU legislation, we have tested whether the presence of a regulatory institution makes a difference for liberalising a traditional utility network such as the railway. Further studies should focus on the impact of this dimension of regulatory governance on policy outcomes, such as rail tariffs and the level of customer satisfaction.

Overall, this article provides practical recommendation for the fourth reform package: the political independence of regulator matters more than a full institutional separation in ensuring catching-up convergence toward an open and non-discriminatory EU rail market. However, the establishment of the ERA will occur when national IRAs have been effective in promoting liberalization. The experience of national IRAs shows also that independent regulators cannot intervene without a complaint. Accordingly, a fully open access to passenger markets is necessary to be implemented concomitantly to the establishment of the ERA.

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## NOTES

1 We thank an anonymous reviewer for suggesting to focus on the key changes in economic governance structure.

2 For a review of the evolution of the EU railway liberalization, see Dyrhaug 2013; Finger and Messlam 2015; Holvad 2009.

3 This economic governance model has been considered by the European Court of Justice (Case C-556/10 *Commission v Germany*) as complying with the directive.

4 In June 2008 the Commission sent letters of formal notice to 24 EU member states for their failure in implementing the first railway package. A large part of the Commission's observations regarded the national regulatory bodies that did not have sufficient regulatory powers, sufficient mandate and resources to monitor competition, sufficient independence from the incumbent and/or infrastructure manager, and sufficient accessibility. 12 out of the EU-15 member states were subject to observations regarding regulatory bodies (Holvad 2009, 32-33).

5 The cases of dominant position in railway have been so far limited and again the German incumbent *Deutsche Bahn* (Dyrhaug 2013:74).

6 We controlled also for other institutional (size of central government as percentage of GDP and the World Bank regulatory quality indicator) and political (right or left government) variables. These variables are however statistically insignificant.

7 Market openness as operationalized by the Access index revolves around the economic and law doctrine of non-discriminatory access for railway companies to essential facilities that requires specific regulation of the service sector and administrative practices. This theoretical insight allows data to be collected that are truly comparable across the EU-15 rail markets.

8 The Access index is composed of the following four sub-indexes: information barriers, administrative barriers and operational barriers, share of domestic market accessible, and sales services in passenger transport.

9 Moreover, the LIB index distinguishes the two market sectors only in 2007 and 2011. Focusing on one of the two market sectors would reduce by half the number of observations.

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ONLINE APPENDIX

**NAME AND YEAR OF ESTABLISHMENT OF INDEPENDENT RAILWAY**

**REGULATORS AMONG EU-15**

Country	Name of rail IRA	Website	Year of establishment
Austria	Schiene-Control Gmbh	<a href="http://www.scg.gv.at/en/">http://www.scg.gv.at/en/</a>	1999
Belgium	Service de Régulation du Transport ferroviaire	<a href="http://www.regul.be/en/content/about-service">http://www.regul.be/en/content/about-service</a>	2004
Denmark	Jernbanenævnet	<a href="http://www.jernbanenaevnet.dk">www.jernbanenaevnet.dk</a>	2010
Finland	Finnish Transport Safety Agency (Trafi)	<a href="http://www.trafi.fi/">http://www.trafi.fi/</a>	2010
France	Autorité de Régulation des Activités Ferroviaires et Routières	<a href="http://www.arafcr.fr/">http://www.arafcr.fr/</a>	2009
Germany	Bundesnetzagentur	<a href="http://www.bundesnetzagentur.de/DE/Home/home_node.html">http://www.bundesnetzagentur.de/DE/Home/home_node.html</a>	2006
Greece	Regulatory Authority for Railways	<a href="http://www.ras-el.gr/en/home/name/index">http://www.ras-el.gr/en/home/name/index</a>	2011
Ireland	-	-	No IRA
Italy	Autorità di Regolazione dei Trasporti	<a href="http://www.autorita-trasporti.it/">http://www.autorita-trasporti.it/</a>	2013
Luxembourg	Institut Luxembourgeois de Régulation	<a href="http://www.ilr.public.lu/">http://www.ilr.public.lu/</a>	2010
Netherlands	Authority for Consumers & Markets	<a href="http://www.acm.nl">www.acm.nl</a>	2005
Portugal	Autoridade da Mobilidade e dos Transportes	<a href="http://www.amt-autoridade.pt/">http://www.amt-autoridade.pt/</a>	1998
Spain	Comisión Nacional del Mercado y la Competencia	<a href="https://www.cnmc.es/es-es/cnmc/sobrelacnmc.aspx">https://www.cnmc.es/es-es/cnmc/sobrelacnmc.aspx</a>	2010
Sweden	Transportstyrelsen	<a href="http://www.transportstyrelsen.se">www.transportstyrelsen.se</a>	2004
United Kingdom	Office Rail and Road	<a href="http://orr.gov.uk/">http://orr.gov.uk/</a>	1993



## DESCRIPTIVE STATISTICS

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Variable	N	Mean	Std. Dev.	Min.	Max.
$\Delta$ IBM Access	45	64.73	145.77	-150	505
IBM Access <sub>t-1</sub>	45	554.6	221.164	100	840
Vertical separation dummy (one year lag)	45	0.73	0.48	0	1
Full institutional separation dummy	45	0.47	0.50	0	1
IRA dummy (one year lag)	45	0.29	0.458	0	1
Market structure (one year lag)	45	3.63	2.272	0	6
Veto players index (one year lag)	45	3.39	4.66	0	22.66
Trade union density (one year lag)	45	37.54	21.32	7.59	78.03

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## STATISTICAL MODELS

To assess the extent of catching-up convergence, we rely on the following, basic model, equation:

$$\Delta y_{i,t} = \alpha + \beta y_{i,t-1} + \sum_{k=1}^K \gamma_k x_{i,t,k} + \epsilon_{i,t} \quad (1)$$

where  $\Delta y_{i,t}$  is the change in the degree of liberalization in the rail market of country  $i$ . The coefficient  $\beta$  of the variable  $y_{i,t-1}$ , i.e. the country's level of rail market access in the previous period of observation, represents the speed of adjustment. A negative and significant value of this coefficient implies convergence towards the EU model of railway governance. Given the limited number of observations, we included only few control variables: market structure, the number of institutional veto players and the density of trade unions. Accordingly,  $\gamma_k$  is the coefficient of  $x_{i,t}$ , i.e. the vector of the variables associated with rail market structure, veto players and trade union density; and  $\epsilon_{i,t}$  is an error process assumed to be independent and identically distributed.

To estimate the effect of vertical separation and the establishment of IRAs on the speed of adjustment (across the EU-15) towards the EU rail liberalization model, we rely on the following:

$$\Delta y_{i,t} = \alpha + \beta_0 y_{i,t-1} + \beta_1 z_{i,t} + \beta_2 y_{i,t-1} z_{i,t} + \sum_{k=1}^K \gamma_k x_{i,t,k} + \epsilon_{i,t} \quad (2)$$

The interaction term,  $y_{i,t-1} z_{i,t}$ , comprises the rate of convergence, depending on  $z_{i,t}$ , the dummy variable indicating either vertical separation or the establishment of a national IRA. Accordingly, our main expectation is that  $\beta_2 \neq 0$ . If  $\beta_0 \neq 0$ , then convergence is caused partly by the presence of IRAs and partly by other unobserved factors; if  $\beta_0 = 0$ , then the converge process is entirely due to the constraint,  $z_{i,t}$ .